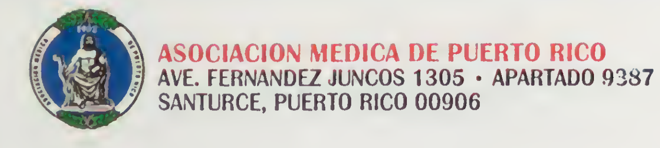
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Editorial:

Las Benzodiazepinas en el tratamiento del dolor

José C. Román De Jesús, M.D.

Durante los últimos años una serie de medicamentos que pueden encasillarse dentro de este denominador, (benzodiazepinas) han salido al mercado y han sido utilizados con propósitos sedantes e hipnóticos principalmente, aunque dado el punto de vista farmacológico tiene una amplia gama de acción, en muchas ocasiones diferentes entre sí.

Las benzodiazepinas reciben su nombre debido a que, básicamente casi todas, están compuestas por un anillo de benzeno unido a otro de diazepina. Las características que comparten en común a todas y que se deben a su acción sobre el sistema nervioso central, son; sedantes, hipnóticos, ansiolíticos, relajantes musculares, anticonvulsivos y amnésicos. La administración endovenosa produce vasodilatación periférica y en altas dosis, bloqueo neuromuscular. Se sabe que el mecanismo de acción, tratando de ser lo más breve posible, es el resultado de que el efecto inhibidor neural se potencializa y mediado por el ácido gamma-aminobutírico (GABA). Bien, hasta aquí no tenemos dudas de las indicaciones terapéuticas de estos medicamentos, sobretodo del Diazepam. Pero veamos entonces ¿están indicados en el tratamiento del dolor? ¿Del agudo? ¿Del crónico? Actualicemos.

King y Strain han señalado en un trabajo publicado en junio del 90, donde no solo se critica negativamente el uso de narcóticos en el dolor crónico, y se identifica como un "mal uso y mal manejo de una droga", sino que caen también dentro de estas conceptualizaciones los medicamentos sedantes e hipnóticos como las benzodiazepinas. Ellos acentúan el hecho de que a pesar de que el Instituto de Medicina en 1987 advirtió, que dado los problemas de sueño que tienen, los pacientes de dolor crónico utilizan mal (sobreuso) los sedantes-hipnóticos a la hora de dormir, se siguen recetando. En el libro sobre este tema Krishnan y sus colaboradores plantean la frecuencia del uso de estos medicamentos (benzodiazepinas) en pacientes vistos por ellos. Nosotros también hemos encontrado esta sobre-utilización en una gran parte de nuestros pacientes. Otros autores enfocan en sus trabajos la misma problemática, como Ziesat, Hendler, Hollister, Turner y sus colaboradores. En todos estos trabajos se ha probado que los pacientes en el régimen descrito (benzodiazepinas y analgésicos; benzodiazepinas solos) que se han sometido a la prueba conocida como el Inventario multifísico de la Personalidad de Minnesota (MMPI) han demostrado tener mayor incapacidad física y sicológica que el grupo que no lo ha utilizado. Ampliando el contenido de todos estos trabajos y su aplicación practica a la clínica se demuestra que existe poco beneficio y aún puede ser negativo la utilización de estos medicamentos.

Las razones: su propia farmacología, la acción inhibitoria que tiene como agonista de los receptores de ácido gamma amino butírico (GABA); su efecto inhibitorio de la secreción de serotinina, necesaria, para los mecanismos endógenos de control del dolor. Algunos revelan, ademas, que tienen efectos antianalgésicos y acentúan la tolerancia a los oproides.

King y Strain, siguen señalando en sus conclusiones, en una revisión de 114 pacientes que el uso de las benzodiazepinas en pacientes de dolor crónico es frecuente; que una vez se inicia, su uso es prolongado, rara vez discontinuado y se mezcla frecuentemente con narcóticos y aunque mejoran el patrón de sueño no tiene efecto alguno en mejorar el dolor; no habiendo evidencia que demuestre el beneficio, de su utilización. Mowks y Merskey nos mencionan sus reservas en el uso de las benzodiazepinas para el dolor crónico. Por el contrario, se ha demostrado, que causan dependencia e incapacidad cognitiva, promoviendo la queja de dolor. Ellos aunque lo usan en algunos pacientes, muy rara vez los ordenan en pacientes de dolor crónico. El comité que estudia la dependencia a las benzodiazepinas de la Asociación Americana de Psiquiatría y que establece el patrón por el que se sugiere la utilización de estos medicamentos, este patrón contradice la forma en que se están usando en estos casos. Entonces es posible que estemos provocando una dependencia fisiológica iatrogénica inducida. Es necesario conocer la reacción severa que produce el síndrome de abstinencia en los usuarios crónicos de estos medicamentos. Krishnam y sus colaboradores aportan más al debate: que su uso puede catalogarse como abuso ya que contribuye al cuadro depresivo que vemos en estos pacientes y a la reducción de su capacidad cognitiva; llegando, por este efecto: la depresión, a contraindicar las benzodiazepinas en este sector poblacional.

Ante esta información concluímos y recomendamos que solo se use benzodiazepinas en los casos de dolor agudo en donde encontremos un factor de ansiedad y su uso ha de descontinuarse tan pronto cesa el cuadro, vigilando siempre la cantidad indicada evitando así su continuo uso via la automedicación, tan frecuente en nuestro medio. Por otro lado insistimos en la contraindicación de las benzodiazepinas en el paciente con dolor crónico y menos por tiempo prolongado.

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Editorial:

Tuberculosis: UN PROBLEMA DE HOY

Por: Rosa I. Román Carlo, M.D.

Recientemente la tuberculosis ha tomado mucho auge en los medios médicos y paramédicos. Una enfermedad cuya tendencia a desaparecer fue logarítmica hasta la década pasada en la cual comenzó a aumentar su incidencia; de tener un cifra de 1.7 en 100,000 al presente las cifras han aumentado a 18-20 en 100.000 habitantes, en muchas áreas endémica. La Organización Mundial de la Salud ha declarado una nueva epidemia mundial de tuberculosis. Chile, uno de los principales países del cono sur aceptó, recientemente, la epidemia. Esta exhortación internacional a tomar medidas para evitar un mal mayor, es un llamado a nosotros los médicos a organizar programas de educación y prevención en nuestras comunidades. Para esto tenemos que concientizarnos de lo que es la tuberculosis y actualizar nuestros conocimientos sobre el tema.

El mycobaterium tuberculoso, un bacilo alcohol resistente, es altamente contagioso por la via aérea, su medio de contagio principal son las gotas de saliva. Que en el paciente infeccioso pueden ser partículas que varían entre 2- 10 micras, permitiendo que los bacilos lleguen a la via periférica donde los mecanismos de defensa no son tan efectivos, allí la primoinfección se encapsula y multiplica o forma un granuloma.

Posteriormente cuando las defensas disminuyen la enfermedad se activa, el paciente desarrolla tos, fiebre, sudores nocturnos, pérdida de peso y en ocasiones hemptisis.

El diagnóstico se realiza por los métodos tradicionales los cuales son el derivado de proteína purificado (PPD) la tinción ácido alconol resistente y el cultivo en diferentes medios. La identificación del bacilo puede tomar desde varios dias, por métodos de radioinmuno ensayo; hasta varios meses en los medios de cultivo tradicional. El bacilo se inactiva por la luz ultravioleta, razón por la cual la toma de cultivo se hace en frascos ambar con protección ultravioleta.

Una vez hecho el diagnóstico el paciente se clasifica como tuberculosis activa y se inicia la terapia que aquí en Puerto Rico por existir un alta incidencia de resistencia a isoniazida, la terapia consiste de isoniazida (INH), pirazinamida (PZA), etambutol (EMB) y rifampin (RIP). Esta dura de 6-8 semanas luego si los cultivos son negativos se continúa con INH y RIP por 4 meses más en el protocolo corto de 6 meses. En el protocolo de nueve meses los pacientes se inician en 4 drogas también pero la INH y RIP se administran por 9 meses o 6 meses después del último cultivo negativo. En los casos de paciente con virus de SIDA el tratamiento debe ser por un promedio de un año.

Hablando más a fondo de la prevención y cernimiento de pacientes debemos profundizar en un tema importante, la profilaxis. Toda persona; con sospecha de contacto o trabajador de la salud, debe ser evaluado con prueba de PPD. A las 48 horas se va a considerar reactivo a toda persona con una induración mayor o igual a 10 mm, aquellos que tienen la prueba de VIH positiva se va a considerar reactivo con una induración de 5 mm. Las persona vacunadas con la BCG se consideraran reactivas si presentan una induración de 15 mm o mas. Debemos recomendar profilaxis en todas la personas menores de 35 años, todos los convertidores resientes (menos de 2 anos), todo paciente inmunocomprometido con enfermedades crónicas como diabetes, fallo renal, cáncer, gastrectomías, VIH o SIDA.

La profilaxis debe ser por un promedio de 6 meses exceptuando en los niños y los pacientes con VIH; los cuales deben recibir profilaxis por un año.

La única forma de controlar la epidemia es identificando temprano los casos activos, iniciando una terapia efectiva y adecuada. En nuestra isla el programa de Control de Tuberculosis atraviesa por una crisis y somos nosotros los médicos de la comunidad quienes tenemos la responsabilidad de educar al pueblo de los beneficios de la profilaxis y de la importancia en el cumplimiento del tratamiento. Una de las razones de la alta incidencia de resistencia entre los puertorriqueños es la falta de cumplimiento en la terapia.

En la nación americana se ha hablado de bacilos super resistentes que aun en nuestra isla no son comunes, pero si no controlamos la epidemia pronto van ha abundar entre nosotros.

Hace varios meses se encontró un aumento de la incidencia de tuberculino positivo entre el personal de enfermería de los hospitales de Area. La forma mas sensata de controlar estos contagios entre el personal paramédico es que: el personal médico y paramédico sea evaluado con PPD, toda persona con tuberculina significativa (> 10 mm) que trabaje en alto riego (personal médico y paramédico) convertidor resiente tiene que tomar isonizida por lo menos 6 meses si tiene la prueba de HIV negativo, si esta es positiva la profilaxis es de 9-12 meses.

En los centros de trabajo deben establecerse seminarios educativos de protección universal y de tuberculosis por lo menos dos veces al año. Las áreas de mayor riesgo como Sala de Emergencia, piso de Medicina, sala de procedi-mientos deben contar con luces ultravioletas y máscaras respiradora de partículas o máscaras que filtren partículas de 2 micras o mas en un 99%. Todo paciente sospechoso debe ser aislado en cuartos preparados con luces ultravioleta y presión negativa. Protegiendo al personal médico y paramedico, iniciado un programa de profilaxis, reactivando los centros de control de tuberculosis iniciamos nuestra lucha en el control del problema.

Es indispensable que se aliente la instalción de laboratorios especializados y capacitados para el cultivo e identificación temprana del bacilo. Areas como el oeste y centro carecen de facilidades minimas, esto facilitara la labor de nuestros médicos y agilizara el tratamiento temprano de la enfermedad.

Los planes médicos deben comenzar a tomar su responsabilidad en el problema, iniciar un programa en el cual se cubra la profilaxis y el tratamiento.

Es responsabilidad de todo promovedor de la salud tome su parte en la solución de un problema que crece diariamente y promete con empeorar la epidemia del mal del siglo, HAGAMOS ALGO AHORA...

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Hypercholesterolemia in Children

Ginel Rodríguez, MD., FAAP - Myrna Nieves, M.D.***

Summary: **Coronary heart disease is the leading cause of death in Puerto Rico. Enough evidence exists to believe that coronary heart disease begins during the pediatric age. There has been and increased interest in recent years about the rationale for detection and treatment of hypercholesterolemia in children. Blood samples of 506 patients ages 3 to 17 were analyzed for plasma cholesterol level using the method RA-1000 Technicon. Measurement of cholesterol, blood pressure and Quetelex index were obtained during the sampling. Family history, and past history were also determined to compare the relationship between positive family history for coronary heart disease and cholesterol value. Based on these samples we concluded that 30% of the sampled population had high cholesterol values for age.**

Introduction:

The findings of advanced atherosclerotic lesions early in life, high cholesterol levels and the development of clinical manifestations years later, can all be prevented[1]. There is compelling evidence that early intervention results in lowering risk of coronary disease since atherosclerosis has its onset in early life[2]. This is not a newly discovered concept. In the late 1950's Holman and colleagues drew attention to the possibility that the atherosclerotic process has its origin in childhood.

An ongoing controversy exists in the pediatric literature on whether to screen children and adolescents for elevation of serum cholesterol and lipid levels. The roots of this controversy are complex. First, it is not clear whether elevations of cholesterol levels detected in children or adolescents track into adulthood, and, even if detected, whether it would be safe and efficacious to treat hypercholesterolemia during childhood. [3,4]

Furthermore, it is not established at what age it would be best to begin screening for hypercholesterolemia.

Preventing or slowing the atherosclerotic process in childhood and adolescence could promote better life quality[5]. Since pediatricians are used to the modality of incorporating preventive measures into their daily practice, it is pertinent to explore the prevalence of hyper-cholesterolemia in our pediatric Puertorrican population.

Materials and Methods:

We studied 506 patients 3 to 17 years old evaluated in our Residents continuity Clinics during 1991. After a written consent, patients were tested for non-fasting cholesterol levels. A questionnaire was given to parents or guardians to obtain family history in order to identify high risk patients; weight, height and blood pressure was taken in each patient. Body mass was calculated by the quetelet index (weight/height^2).

Blood samples were processed in our Laboratory Medicine Departemnt using the RA 1000 Techincon. The value of 170 mg/dl was selected as the cutoff point for the 75th percentile for children and adolescents. This value represent the 75th percentile of reference values form the National Cholesterol Education Program, 1992 and the American Academy of Pediatrics[4]. Levels below this value were classified as acceptable. All patients with levels at or above 170 mg/dl were retested to verify results.

Family history was classified in significant, moderately significant and highly significant catergories using our own scoring system to try to establish a relationship between family history and hypercholesterolemia. We asked specifically for a history of coronary heart disease, angina, myocardial infarction, hypertesion, peripheral vascular disease and diabetes. We classified as significant if 1-2 of the above conditions were present; moderately significant if 3-4 of the conditions were present, and highly significant if more than five (5) of the above were present.

Differences among groups with cholesterol and blood pressure as well as the relationship between family history and hypercholesterolemia were examined with a X^2 analysis. A P value of < 0.05 was considered significant.

Results:

We sampled 506 pediatric patients ranging from 3 to 17 years old and determined that the mean cholesterol level of our sample was 167 mg/dl SD + 35. The average of our population was 8.2 years old. 56% were male and 43.9% were females. Fig I shows the distribution of our sample comparing sex and cholesterol value. For the range values of 150 - 159 mg/dl, boys show the highest prevalence with 93%, 53% of the girls were in the 170 mg/dl values (Fig. II). Fig. III demonstrate the distribution of ages and the percentages of those with cholesterol value above 170 mg/dl. For the ages 3 to 5 years old, 30% (N = 28) had cholesterol >170 mg/dl and for 6 to 8 years old 36% (N = 35). For the 9 to 11 years old, 35% (N = 41), had hypercholesterolemia. For the 12-14 years old age group, 29.3% (N = 34), had

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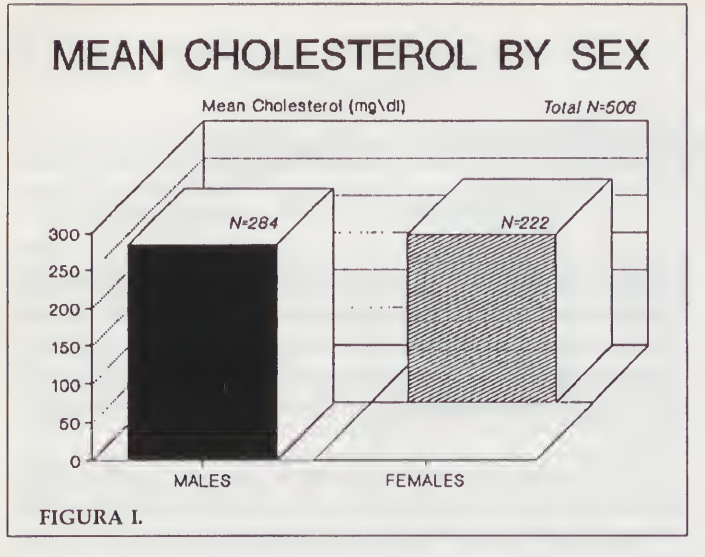


FIGURA I.

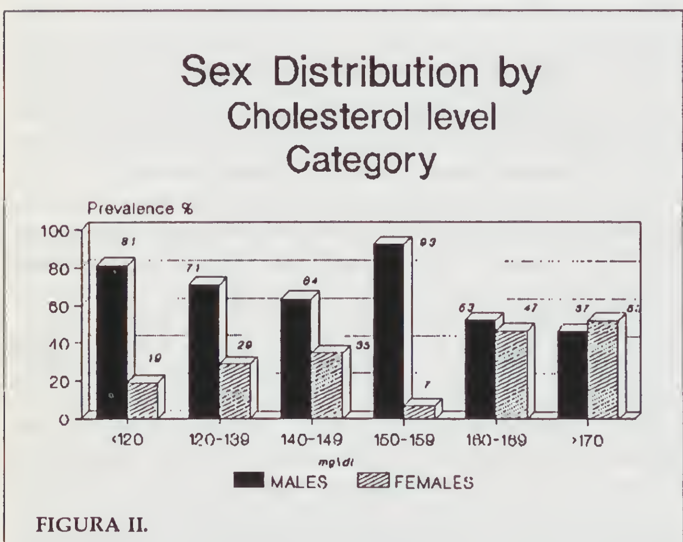


FIGURA II.

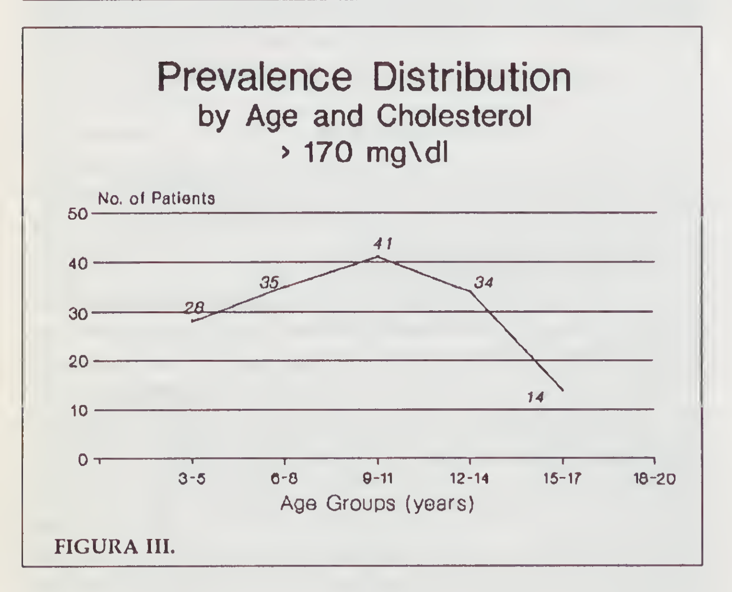


FIGURA III.

cholesterol ≥ 170 mg/dl; and 19% (N = 14) in the 15-17 age category had cholesterol above the established value. These findings were not staticsally significant in any group category (P > 0.05).

Among the 506 patients, 30.2% had high cholesterol levels. Of these: 27.1% were males and 34.2% females (X2 = 3.06 P > 0.05). We found no significant differences in values among sexes. (Fig. IV). These patients were retested with a mean cholesterol value of 202 mg/dl.

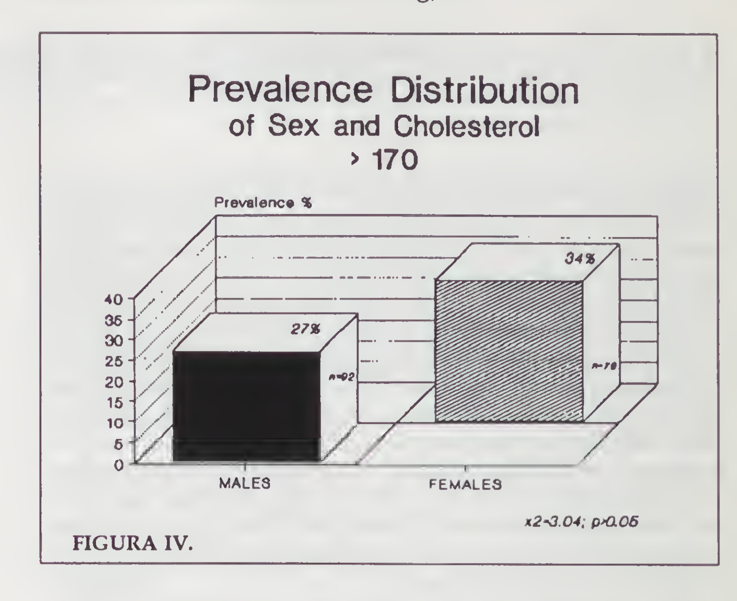


FIGURA IV.

Fig. V shows a tendency for a peak in cholesterol values for the 9 and 11 years old category for the whole population.

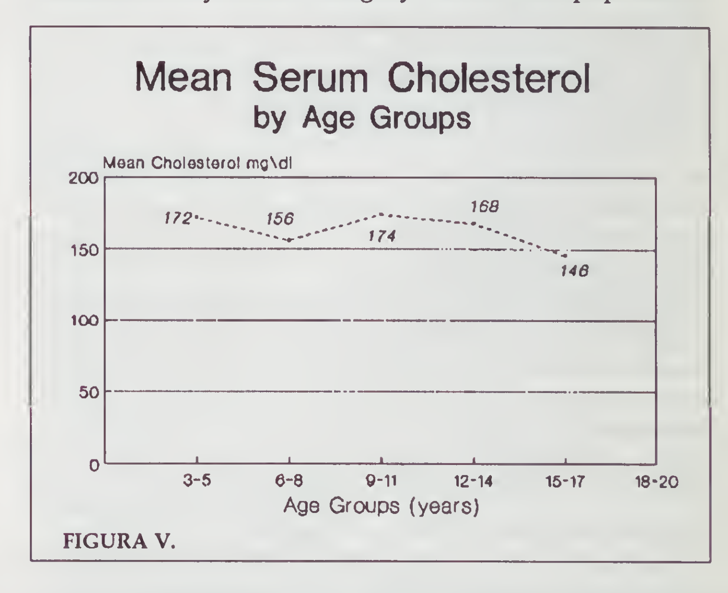


FIGURA V.

We observed that body mass is not predictive of increased cholesterol levels. Fig. VI shows Quetelex index as a measurement of body mass and the cholesterol values. No relationship was observed between increased body mass and increased cholesterol level. The opposite was also true.

A definite trend was observed associating serum cholestarol levels and positve family history. This was statistically proven ($p < 0.05$).

The most common condition seen as part of the family history was hypertension, present in the history of 292 of our patient (58%, N = 292) Fig. VII.

Approximately 30% of our patients would have never been sampled for cholesterol levels if consideration to a negative family history had been an absolute requisite in our study. Of those with negative family history, 12% had hypercholesterolemia. Table I demonstrates no statistical significance between type of family history, and cholesterol value ≥ 170 mg/dl.

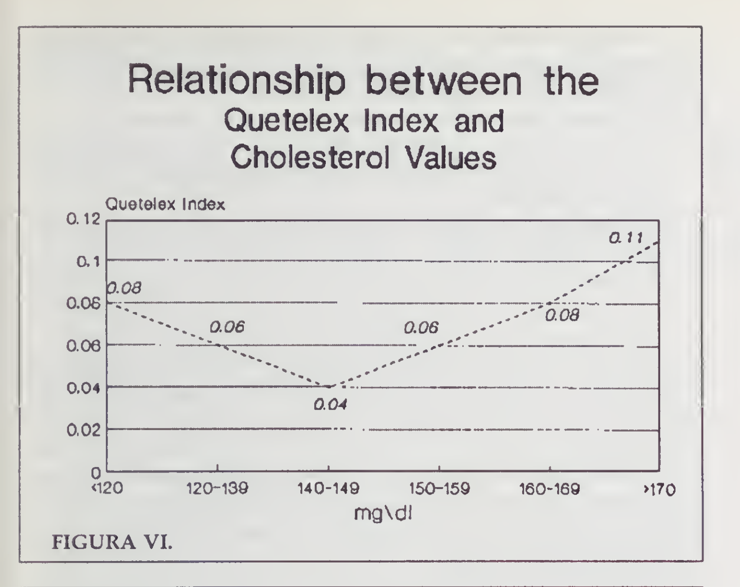


FIGURA VI.

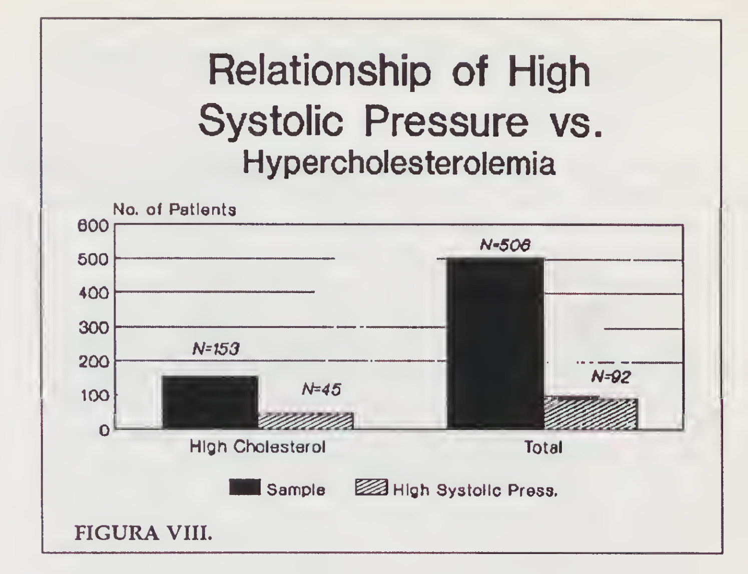


FIGURA VIII.

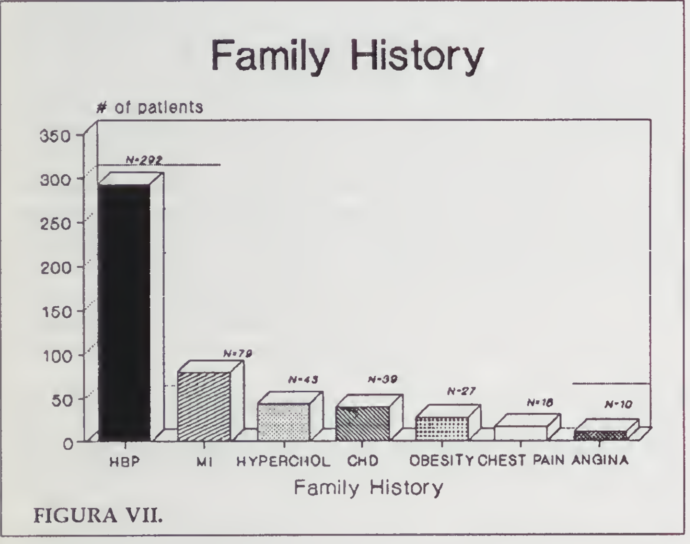


FIGURA VII.

TABLA I.

FAMILY HISTORY AND CHOLESTEROL VALUE ≥ 170 MG/DL

TYPE	N	%	P VALUE
Significant	50	32.6	ns
Moderately Significant	33	21.5	ns
Hihgly Significant	70	45.7	ns

No proven statistical relationship between systolic pressure above the 95th percentile and serum cholesterol value was observed ($P > 0.05$). Among the total population studied, 18% (N = 92), have high blood pressure. Those with high cholesterol and hypertension were 49% of our sample, (N = 45). Figure VIII.

Discussion:

A large body of epidemiologic studies support a direct relationship between the level of total cholesterol and the prevalence of coronary heart disease and atherosclerotic disease[4]. In the pediatic field, the questions of when to start screening, how often, and when to treat still remain a controvesial issue.[3-4]

Our preliminary study is highly suggestive of significant findings and merits further investigation. Until more widely accepted guidelines are available, we believe that it is reasonable to screen for hypercholesterolemia at least once a year in children age three (3) and older.

Cholesterol screening in the pediatric age based on the family history alone, should probably be abandoned because of the high percentage of patients in our study with high cholesterol who had no family history or predisposing factors. The role of family history factors as screening criteria for hypercholesterolemia in childhood requires re-evaluation.[7]

We believe that the most important clinical implication of this study is that the presence of abnormal cholesterol values in a child, should make assessment of parental and sibling lipid values mandatory[10]. The relative efficiency of screening the pediatric puertorican population at large should be established by further studies.

The National Institutes of Health, Heart, Lung and Blood consensus statement recommend using the 75th percentile (170 mg/dl) as the cutoff cholesterol value for moderate risk and the 90th percentile, (185 mg/dl), as the cutoff for high risk[16]. Recently, the American Academy of Pediatrics recommended a cutoff value of 175 mg/dl for children.[5] Cutoff values for determining risk in children are inconsistent. A child with a cholesterol level in the 75th percentile (170 mg/dl), has twofold greater risk of coronary artery disease[8]. We therefore recommend to use the value of 170 mg/dl as a marker for moderate risk, base on our findings and on the high prevalence of CHD in our population, our dietary habits, and on the probability of establishing and early pattern of intervention for prevention of hypercholesterolemia.

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Resumen: **Las enfermedades del corazón son la causa principal de muerte en Puerto Rico. Existe evidencia substancial para creer que las enfermedades de las coronarias comienzan durante la edad pediátrica. Recientemente ha surgido un marcado interés acerca de los fundamentos para la detección y tratamiento de la hipercolesterolemia en niños. Muestras de sangre de 506 niños entre las edades de 3 a 17 anos fueron analizadas para colesterol plasmático usando el método RA-1000 Technicon. Durante el nuestreo se obtuvo la presión sanguínea y el Indice Quetelex. Historial familiar e historial pasado fueron también determinados para comparar la relación entre historial familiar positivo para enfermedades cardíacas y el valor de colesterol. Basado en este muestreo concluimos que un 30% de esta población muestreada tienen nivel alto de colesterol sobre lo aceptado para la edad pediátrica.**

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The Use of Botulinum Toxin Type A for the Treatment of Facial Spasm

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Summary: We describe our experience with the use of botulinum A toxin for the treatment of patients with facial spasms. Thirty four patients with *blepharospasm*, thirty eight with *hemifacial spasms* and three with *spastic* entropion were injected with the use of Botulinum A toxin. Lenght of follow up ranged from 6 to 60 months. The effect of toxin lasted an average of 12.1 weeks in patients with *blepharospasm* and 15.5 weeks in patients with *hemifacial spasms*. This difference in mean response was statistically significant ($p=0.0001$). The most common side effect was ptosis and dry eyes. All side effects were transient in nature, lasting between three and twelve weeks. Botulinum toxin type A injections represent a good alternative for the treatment of facial spasms. It is a safe and effective office procedure. Most patients tolerate the procedure well. Its principal drawback is its transient effect and the need for repeated injections.(key words - blepharospasm, hemifacial spasm, spastic entropion, botulinum A toxin)

Introduction

Clostridium Botulinum produces eight immunologically distinct types of neurotoxin (A-G)(1). Botulinum toxin blocks neuromuscular transmission by interfering with the calcium dependent release of acetylcholine at the presynaptic membrane(2). Oculinum or Botox is a diluted purified derivative of Botulinum Toxin Type A. One unit of the drug is equal to the amount of toxin needed to kill 50% of a group of 18-20g female Swiss Webster mice (LD50). The median lethal dose for humans is about 2ug.(3); 2.5 units is equal to .001ug/0.1 ml.

The use of Botulinum Toxin Type A in ophthalmology was originated in 1973 by Dr. Allan B. Scott, as an alternative to surgery for the correction of non-accommodative strabismus(4). Since then, indications for Botox have expanded to include: Essential Blepharospasm (5), Hemifacial Spasm (6), Spastic Entropion (7), Lateral Rectus Palsy (8), Spasmodic Torticollis (9), Spasmodic Dysphonia (10), Distal Limb Dystonias (11), Oromandibular Dystonias (12), Spasms of Anal and Urinary Sphincters(13), Aberrant regeneration of the facial nerve (7), Corneal Exposure (7), Myokimia (7), Third Nerve Palsy (14), Subacute Thyroid Ophthalmopathy (7), and Apraxia of Eyelid Opening (15). Many of these conditions have one common drawback, that is, their poor response to medical therapy and their recurrence after surgery.

The use of Botulinum toxin type A was under investigational protocol by the Food and Drug Administration (FDA) until December 1989. Until then, only patients which had not responded to medical therapy were candidates for botulinum injections. The purpose of the study was to determine the duration of the effect, the dose at which this effect is maximum and possible side effects. We are reporting our experience with the use of Botulinum toxin type A for the treatment of patients with facial spasms.

Materials and Methods

Since September 1985, ninety-two patients have been included in the study protocol (forty five with Blepharospasm, forty four with Hemifacial Spasms and three with Spastic Entropion). Seventeen patients have been eliminated from the analysis reported here due to inadequate follow-up (six with Hemifacial Spasm and eleven with Blepharospasm). We are left with thirty four patients with blepharospasm, thirty eight with hemifacial spasm and three with spastic entropion.

All patients were informed about the investigative nature of the drug and all were offered surgery as an alternative. A complete ophthalmological examination was performed and CT Scan or MRI were obtained in patients with hemifacial spasms. Pertinent literature on their specific condition was supplied to each patient and they were told that they could abandon the study whenever they desire to do so. Informed consent was obtained from each patient. Videos or photos before and after the injection were obtained for most patients.

The patients had been experiencing blepharospasm for an average of 4.4 years (range 2mo-32 years); while patients with hemifacial spasms had symptoms for an average 6.7 years (range 2mo - 25 years). In the blepharospasm group there were 12 males and 22 females; among the hemifacial spasms there were 17 males and 21 females. The mean age in the blepharospasm group was 60.3 (range 31 - 77); the mean age in the hemifacial spasms was 58.7 (range 18 - 80). Fourteen patients with hemifacial spasm had the condition in the right side, while 24 had it on the left.

Out of thirty-four patients with blepharospasm, eleven were hypertensive, five had diabetes, four had meige syndrome, two had parkinsonism, and one had progressive supranuclear palsy (Table I). Out of thirty-eight patients with hemifacial spasm; ten were hypertensive, four diabetic, three had peptic ulcer disease, and one had facial nerve palsy (Table II). These patients had taken an average of two medications for their condition (range 0-9). None of them had undergone any surgical procedure as treatment for their condition, but four had received acupuncture, previously, with unsatisfactory results. One patient discontinued receiving injections in order to try acupuncture and later returned to resume the treatment.

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The following ordinal scaling was employed to measure the degree of spasm:
+0 - None
+1 - Increased blinking caused by external stimuli
+2 - Mild, noticeable fluttering; not incapacitating
+3 - Moderate, very noticeable spasm, midly incapacitating
+4 - Severely incapacitating (unable to drive,read,etc.)

TABLE I

SYSTEMIC AND NEUROLOGIC CONDITION OBSERVED IN PATIENT WITH BLEPHAROSPAM

Condition	Number of patients
Hypertension	11
Diabetes	5
Meige	4
Parkinsonism	2
Progressive Supranuclear Palsy	1
TOTAL	23

TABLE II

SYSTEMIC AND NEUROLOGIC CONDITION OBSERVED IN PATIENTS WITH HEMIFACIAL SPASM

Condition	Number of patients
Hypertension	10
Diabetes	4
Peptic Ulcer Disease	3
Previous Facial Nerve Palsy	1
TOTAL	18

The duration of effect was determined as the time interval in weeks of any significant relief of spasm; not as the time interval between treatments. No placebo treatments were given. Length of follow up was 6-60 months.

A failure to respond to an injection was defined as a duration of effect of less than four weeks or a failure to decrease the spasm intensity by +2 on the ordinal scale.

Injections were placed subcutaneously with a 27 gauge needle or tuberculine syringe. Starting dose in the upper lids was five units per site. Injections in the upper lids were placed medially and temporally avoiding the central portion of the eyelid. The number of sites on the face varied depending on the number of muscles which were on spasm. If the response was not satisfactory the dose was increased by 2.5 units per site up to a maximum of 12.5 units per site in the upper lids. If no significant improvement on this dose was noticed or if side effects developed, the amount of toxin injected was decreased to the level at which the patient felt better. The patients were re-examined in one or two weeks and subsequently every two or three months unless symptoms recurred earlier or there were any complications. In certain cases a telephone call substituted the post-injection visit if the patient had some difficulty with transportation. Also, when for certain reasons patients missed an appointment, we attempted to contact them in order to continue the follow-up.

The data were submitted to both parametric and nonparametric statistical analyses. Wilcoxon - Mann - Whitney two sample test was performed to contrast the average difference between patients with blepharospasm and patients with hemifacial spasm groups regarding the degree of spasm before treatment and to asses the mean difference in duration of response to treatment between the blepharospasm and hemifacial spasm groups. Kruskal - Wallis test was used to compare the duration of effect of the injection across different levels of dose/site in upper lids.The assumption of sample independence for this last test may not hold given the nature of the design of data collection process in the study.

Results

The mean degree of spasm pre-injection in patients with blepharospasm was 3.63 and with hemifacial spasm 3.08 which was a statistically significant difference ($p < .0001$). A total of 396 injections were given to seventy-two patients.Eighty-nine percent of patients with blepharospasm and 92% with hemifacial spasm had an excellent response in terms of relief of spasm to the first injection (no spasm). The difference was not statistically significant ($p = 0.32$).

The mean duration of effect in patients with blepharospasm with a dose of 5 units/site was 12.5 weeks, and with a dose of 7.5 units/site the mean effect lasted 11.9 weeks. Increasing the dose level to 10 units/site produced a mean duration effect of 11.3 weeks. When we increased the level to 12.5 units/site the effect lasted a mean of 10.4 weeks. The differences in mean duration of effect at different dose levels were not statistically significant ($p = 0.732$).

In patients with hemifacial spasm the mean duration of effect with a dose of 5 units/site was15.8 weeks. With a dose level of 7.5 units/site the mean duration of effect was 14.1 weeks, with 10 units/site it was 13.6 weeks and with 12.5 units/site lasted 12.0 weeks. The differences were not statistically significant ($p = 0.55$).

The difference in mean duration of effect due to Botulinum toxin type A injections observed between patients with blepharospasm and patients with hemifacial spasms (12.1 weeks vs. 15.5 weeks) was found to be statistically significant ($p = 0.0001$).

In patients with spastic entropion the effect lasted 4-10 weeks. These patients experienced rubbing of the cornea by the eyelashes while the toxin was in effect. Therefore, all of them were submitted to surgical correction of their entropion.

The results of side effects are summarized in Table III. The most common side effects in patients with blepharospasm were ptosis in 10.3% of the injections and excessive tearing in 2.9% of the injections. In 2.5% of the injections the patients complained of dry eyes. One patient complained of diplopia due to lateral rectus weakness. All the side effects were transient, lasting approximately 3-12 weeks. There were no systemic side effects. One patient had a withdrawal reaction as she was being tapered off from her medications. Another died of leukemia. There was no direct association between increasing dosage and incidence of side effects. Among the patients with hemifacial spasms, the most common side effects were dry eyes in 5.6% of the injections,

TABLE III

RESULTS ON SIDE EFFECTS FOR PATIENTS WITH BLEPHAROSPASM AND HEMIFACIAL SPASM

Side Effects	Blepharospasm	Hemifacial Spasm
	% of injections	
Ptosis	10.3%	4.1%
Tearing	2.9%	4.6%
Dry Eyes	2.5%	5.6%

tearing in 4.6%, lagophthalmos in 4.1% and ptosis in 4.1%. One patient complained of diplopia due to superior rectus weakness and one patient had a corneal dellen. Duration of side effects was between 2-12 weeks.

Among the 203 injections applied to patients with *blepharospasm*, a failure to respond was observed in 15.1% of the injections. Among the 193 injections given to patients with *hemifacial spasm*, in 6.7% of the injections there was no positive reaction.

Eight patients were referred for orbicularis stripping procedures. The results on avarage duration by effect before and after surgery are summarized in Table IV. One had obtained complete relief from his spasm, and two did not report any improvement from surgery, but did not want to receive any more injections. In one, the duration of effect after surgery was four weeks less; and in three the duration of effect has been longer. One of the patients was lost to follow up. Among the patients with *hemifacial spasm*, three were referred for microvascular decompression and the results on average duration effect before and after surgery are shown in Table V. One of them was responding well to botulinum toxin type A injections, but developed Trigeminal Neuralgia. The other did not obtain any relief from the injections of botulinum. The third one who decided to undergo a surgical procedure, despite having obtained a duration effect of 18.6 weeks, was lost to follow up.

TABLE IV

AVERAGE DURATION EFFECT BEFORE AND AFTER SURGERY FOR PATIENT WITH BLEPHAROSPASM

Pt/Age/Sex	Average duration Before surgery (weeks)	Average duration After surgery (weeks)
1/63/M	5	16
2/67/F	12	21.3
3/55/M	11.5	No spasm
4/73/F	13.6	No improvement
5/76/F	11	7.1
6/46/F	7.6	10.6
7/77/F	10.5	No improvement
8/39/F	6.5	Lost to follow up

TABLE V

AVERAGE DURATION EFFECT BEFORE AND AFTER SURGERY FOR PATIENTS WITH HEMIFACIAL SPASM

Pt/Age/Sex	Average duration (pre) (weeks)	Average duration (post) (weeks)
1/49/M	18	No recurrence
2/62/M	18.6	Lost to follow up
3/43/F	4	No relief

Discussion

The literature on the use of botulinum toxin type A for the treatment of facial spasms is quite extensive (16-47). Although, there are differences in methodology of implementation, the effect of botulinum toxin type A injections for *blepharospasm* generally last between six and sixteen weeks. In our patients the effect lasted an average of 12.1 weeks (range 4-52 weeks).

Since the duration of effect was based on the time interval on which the patient felt relief from spasms, most of these responses were based on subjective criteria and thus duration of effect will be influenced by differences among patients. Also psychological (26) or functional elements (34) may agravate the condition and influence patients response to treatment. The author agrees with Osako's (7) observation to the effect that patients may complain of spasm even when you actually observe muscle weakness and, on the other hand, there are patients who make no complaint despite the fact that they have residual spasms.

We observed a similar duration of effect (mean = 11.9 weeks) when we used a dose of 7.5 units/site as with the initial dose of 5 units/site. Increasing to higher dose levels did not produce a longer duration of effect, and in fact the durations of effect with doses of 10 units and 12.5 units per site were shorter than with the initial dose.

Analyzing the patients that have received multiple injections, we did not notice any specific pattern of response. One could increase the dose level hoping for a longer duration of effect and obtain a lesser effect, and when one returns to the previous dose to which the patient did not respond, then one can obtain a longer effect. On the whole, one will obtain a similar response no matter how many injections have been given. Similar results were reported by Taylor (16) Kraft (17), and Elston (39). There is a group of patients, however, that would complain that as the number of injections is increased the effect is not the same, and they have to be administered higher doses (24).

There are several biological models that have been put forth to explain the shorter duration of effect with subsequent injections. One involves the formation of antibodies against the toxin. Biglan (50) and Gonnering (51) have not detected antibodies in patients with *Blepharospasm*. Antibodies have been detected, however, in patients with torticollis a condition in which higher doses are utilized (52). Other possible explanation is a blockage of the receptor sites on the nerve membrane by the large inactive protein fragment of the toxin molecule against absorption of active new toxin in patients which are re-injected early (5). More recently, it

has been found that axonal sprouts which develop after functional denervation by botulinum toxin can form new end-plates and, therefore, a single muscle may then be innervated at separate sites by more than one axon (53). These alterations are cummulative with an increased number of injections. This may contribute in part to the increased dose of botulinum required to produce blockade after multiple injections in some patients.

In patients with *hemifacial spasm* the mean duration of effect was 15.49 weeks. The range of average duration of effect in the literature is from 10 to 17.25 weeks. We also observed a similar phenomenon as in patients with *blepharospasm* in that the duration of effect is somewhat shorter as we utilize higher doses. This could be explained by the fact that higher doses were only utilized in patients with unsatisfactory responses to initial injections of toxin. The patients with *hemifacial spasm*, however, had a longer duration of effect than patients with *blepharospasm*. This has been reported previously by other authors (16,17,22,24,47, 51). The difference in response can be explained by the fact that patients with hemifacial spasms have a lower orbicularis force pre-injection than patients with blepharospasm (3); or because hemifacial spasms is mainly an unilateral condition and, therefore, it is less incapacitating than blepharospasm, which affects both eyes.

Patients with *spastic entropion* had an average duration effect of 4-10 weeks. All of our patients ended up receiving surgical therapy. A similar experience was reported by Lingua (27) and Osako (7) who reported an average duration effect of six weeks. Carruthers (46) on the other hand reported three patients in whom the effect of botulinum toxin lasted 3-4 months.

Engstrom (26) and Tsoy (25) found no difference in the effect of botulinum toxin type A injections in patients who had undergone surgery prior to receiving the injections; while Shoor (24) found that the effect seemed to be more prolonged in those that had been operated on previously. Of the 101 patients reported by Elston (39), eleven underwent surgical treatment and four of those resumed injections after surgery. Among our patients, eight have undergone orbicularis stripping procedures and four have returned for injections. In three of them the duration of effect has been longer after surgery.

Up to 1989; 9,983 patients with *blepharospasm* and 5,571 with *hemifacial spasm* have been injected worldwide (7). The cumulative incidence of side effects is 21-27%. Ptosis (7-11%) and corneal exposure (5-12%) are the most common side effects. We have had a similar experience. Corneal exposure and dry eyes are important side effects that have to be treated with ocular lubricants, because there have been reports of corneal ulceration; in one of them leading to corneal perforation in patients with hemifacial spasms (7). Diplopia can occur due to spread of the toxin and involvement of extraocular muscles. The superior rectus is the one most commonly involved with injections in the upper lid. Diplopia can also occur due to involvement of the inferior oblique muscle when injections are placed in the medial two thirds of the lower eyelid (54). This complication occurs in less than 1% of patients. Although, there have been no reports of systemic effect of botulinum toxin type A, Sanders (55) found evidence of abnormal neuromuscular transmission in muscles distant from the site of injection in four patients who had received Botulinum toxin injections for *blepharospasm*. He cautions that if larger doses are used for treatment of other conditions distant effects may become clinically significant since these effects are probably dose related.

Resumen: **Treinta y cuatro pacientes con blefaroespasmo, treinta y ocho con espasmos hemifaciales y tres con entropion espástico recibieron inyecciones de toxina de Botulismo tipo A. La duración del seguimiento fue de seis meses a cinco años. La duración del efecto de la toxina fue de 12.1 semanas en pacientes con blefaroespasmo y de 15.5 semanas en pacientes con espasmos hemifaciales. Esta diferencia en respuesta fue estadísticamente significativa (p=0.0001). Las complicaciones más comunes fueron ptosis y ojo seco. La duración de las complicaciones fue de tres a doce semanas. Las inyecciones de toxina de Botulismo tipo A representan una buena alternativa de tratamiento para pacientes con espasmos faciales. La mayoría de los pacientes toleran el procedimiento bien y no tiene efectos sistémicos; por lo tanto, es un procedimiento que se puede llevar a cabo en la oficina. El único inconveniente es la necesidad de repetir las inyecciones ya que su efecto es transitorio.**

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Articulos Originales:

A Comparison of Albuterol Solution Nebulized versus Albuterol Powder given by Breath Activated Metered dose inhaler.

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Summary: The goal of the present study was to compare the efficacy of nebulized vs powdered albuterol in patients with exacerbated bronchial asthma who required hospitalization. From January to May 1990 known asthmatics admitted with acute exacerbation were included by established criteria. Two groups were randomized. Group I for Albuterol powder 200 micrograms inhaled q 4 hours. Group II with Albuterol nebulized solution 2.5 mg inhaled q 4 hrs. Force Vital Capacity and Force Expiratory Volume in one second were measured with a pressure differential transducer upon admission, 30 minutes and 24-hours following therapies. Absolute FEV1 improvement was calculated. Statistical analysis was performed using student's T-Test and Fisher's exact Test with significance established at $p > 0.01\%$. Fifteen patients enrolled in both groups, two patients of group I were excluded from the statistic analysis due to refusal to continue with the therapy. Both groups were comparable with respect to sex, asthma exacerbations\year, smoking history and hospital length of stay. FVC and FEV1 were comparable also. In contrast, there were significant difference when the absolute improvement were compared. The mean ±SE for FEV1 absolute improvement at the first 30 min was 0.42±0.08 lts for the Group I versus 0.65±0.6 lts in the Group II. In the next 24 hours, Group I was 0.16±0.2 lts versus 0.30±0.7 lts in Group II ($p > .01$). We conclude that although the dose equivalence of both delivery systems have not been established in our study, the nebulized solution was more effective during the first 24 hours of hospitalization than the dry powder.

Introduction

Several studies have been conducted to evaluate the effectiveness of albuterol as a bronchodilator in patients with bronchial asthma. [1,2,3] In these studies, emphasis was placed in comparing albuterol with other ß-2 agonists and placebos, in the presence of bronchospasms induced by a methacholine challenge test.

Various drug delivery methods have been compared for effectiveness. Metered dose freon propelled inhalers (MDI) have been compared with nebulized solution and dry powder breath activated inhalers (Rotahaler).[4] MDI-spacer devices have been compared with nebulized solutions. [5,6,7,8] All of these reports have failed to demonstrate any significant bronchodilator difference among these delivery systems. Neither were there any difference between stable hospitalized or ambulatory asthmatic patients.[9,10] To our knowledge, the comparison between Albuterol dry powder ß-2 agonist via Rotohaler versus nebulized solutions in acute bronchial asthma exacerbation has not been established.

Currently, the most commonly used therapy in patients with severe bronchospasm are ß-2 agonists delivered by nebulizations.[11] This method of administration offers minimal effort for the patient to deliver an appropriate dose of the therapeutic agent. The potential use of self-delivery Freon-metered dose inhaler (MDI) in hospitalized patients once they were stabilized has been reported by Jasper.[7] This presents an effective cost-benefit advantage of this method. Bronsky et all have indicated that the Rotahaler delivery method is effective in the treatment of stable asthma. It is known that Rotohaler needs a minimal peak inspiratory effort higher than 65 Lts/min.[13]

As current policies where the cost-effective health care is imperative, methods must be explored to deliver similar therapy at lower cost, with equal efficacy and fewer side effects. The goal of the present study was to compare the efficacy of two albuterol delivery systems; nebulization versus Rotohaler, in patients with bronchial asthma exacerbation who required hospitalization and had a peak inspiratory flow above 65 lts/min.

Materials and Methods

Patient population. From January to May 1990 we enrolled known asthmatic patients, admitted with an acute asthma exacerbation through the emergency room of a 360 bed Community Hospital and our outpatient clinics. Necessary criteria for inclusion in this study were: i) known history of bronchial asthma as defined by the American Thoracic Society (ATS)[12]; ii) indication of hospitalization with failure of outpatient therapy; and iii) poorly responsive acute exacerbation due to acute bronchitis, upper respiratory infection, sinusitis and or allergic rhinitis. Criteria for exclusion were: i) patient unable to perform a peak flow above 100 lts/min, ii) PO_2 below 60 mm Hg, iii) PCO_2 above 45 mm Hg, iv) lungs showing infiltrates on chest P.A. and lateral x rays, v) allergy to albuterol, and vi) congestive heart failure. Patients were randomized into the following

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two groups: Group I received albuterol powder delivered by Rotahaler and Group II was given nebulized albuterol solution.

Study design. Patients in Group I were given 200 μg of albuterol every 4 hours. Patients in the Group II were given 0.5 ml of albuterol diluted in 3 ml of sterile saline (equivalent to 2.50 mg) every 4 hours via jet nebulizer. All patients received the following supportive therapy during hospitalization: aminophylline, i.v., with maintenance levels of 10-20 mg/ml, methylprednisolone, 50 mg i.v. every 6 hrs, mucolytic syrup, and if needed antibiotics. Arterial blood gases, chest P.A., and lateral plate were performed in all patients at admission. A total of 30 voluntary patients participated in our study.

Spirometric measurements. A respiratory therapist guided the patients through the following protocol: For Group I, exhalation to residual volume and immediately the Rotohaler was placed between the lips followed by a deep breath to total lung capacity. Then the patient was asked to hold the breath for at least 10-15 sec. After this period, the patient was allowed to exhale. This maneuver was repeated until the medication dispenser was empty. For patients in Group II, the nebulizer mouthpiece was placed between the patient's lips and they were instructed to breath in and out slowly during the 15 minutes of the therapy. The Force Vital Capacity (FVC) and the Force Expiratory Volume in on second (FEV1) were measured in all patients upon admissionl 30 minutes and 24 hours following therapies. The spirometric evaluation was performed by a certified respiratory therapist with Fukuda ST-200 bed side spirometer with Fleisch pneumotach (pressure differential transducer). The spirometer was verified with 3 liters syringe prior each test. The patients were requested to perform three trials and measurements were done from the best effort following the ATS standardization criteria.[13]

Determination of the absolute difference of FEVl. The absolute improvement was calculated as follows: FEVl at 30 min minus FEV1 on admission and FEVl at 24 hrs minus FEVl at 30 min.[6]

Statistical analysis. Data were analyzed by descriptive statistics and are expressed as mean±SE. The student's t-test was used for mean comparison. A chi-square or Fisher's exact test was used to determine statistical significance of associations. The level of statistical significance was established at p>O.01%. The statistical analyses were performed using a commercial package (ABSTAT, Anderson-Bell, Cannon City, CO).

Results

Group characteristics. Fifteen patients were enrolled in both experimental groups. In Group I, 7 patients had acute bronchitis, 2 were diagnosed allergic rhinitis and 2 had confirmed sinusitis. Two patients of Group I which had acute bronchitis refused to continue in the protocol and were excluded accordingly. Patients in Group II included, 1 patient with acute sinusitis, 1 allergic rhinitis and 2 acute bronchitis. As observed in Table I, both groups were comparable with respect to number of asthma exacerbations /year, female volunteers, nonsmokers, pack/year within smokers and days hospitalized. Significant differences were observed only with respect to the mean age of the patients. This has been evaluated previously and it has no seen clinical significance among small populations sample.[6]

TABLA I.

Population characteristics

Variable	Group I (n = 13)	Group II (n = 15)	p<
Mean age	35.3	47.6	0.05*
Male	2	5	0.05*
Females	11	10	NS
Smoker	2	6	NS
Nonsmoker	11	9	NS
Pack/year	2.2	4.5	NS

Spirometry. Of the 28 patients who had all three spirometric analysis done (Table II), the FEV1 values obtained on both groups and compared at 30 min and 24 hrs, failed to show any significant differences. In contrast, there were significant differences when the absolute improvement values were compared (Fig.l). The mean+SE for the absolute improvement measured in the first 30 min was 0.42+0.08 for group I and 0.65+0.06 lts for group II. In the next 24 hours, a value of 0.16+0.02 lts was observed in group I as compared to 0.30+0.07 Lts in group II. (p>O.O1).

TABLA II.

Spirometric values

Variable	Group I (n = 13)	Group II (n = 15)	p<
FVC at admission	2.21 ± 1.04	2.13 ± 0.71	NS
FVC at 30 min	2.59 ± 0.94	2.31 ± 0.72	NS
FVC at 24 hrs	2.74 ± 1.00	2.56 ± 0.77	NS
FEV1 at admission	1.67 ± 0.92	1.62 ± 0.68	NS
FEV1 at 30 min	2.10 ± 0.86	1.79 ± 0.68	NS
FEV1 at 24 hrs	2.32 ± 0.83	2.08 ± 0.74	NS

Values expressed in mean±SD.

Hospitalization. The course of hospitalization and length of stay were similar in both experimental Groups. The level of treatment tolerance was >90% and all but two patients completed the therapy. Both groups of patients received methylprednisolone and aminophylline at the time of admission and dose approached the therapeutic range in the first 24 hrs.

Discussion

Our study compares two albuterol delivery systems, the albuterol powder breath activated system trade marked by Glaxo as Rotahaler (RDS) and the usual hospital compressed air nebulized solution delivery system (NSDS). Although

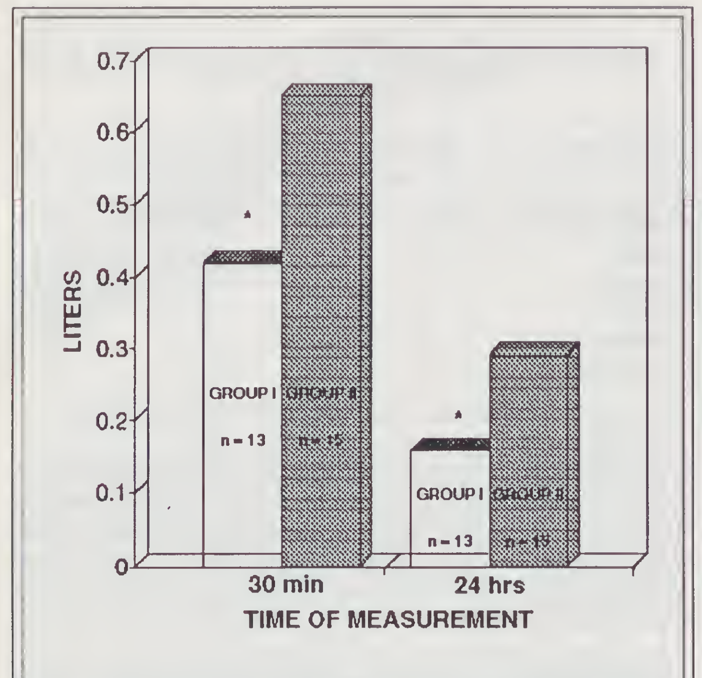


Fig. 1. Absolute difference in FEV1 obtained by albuterol delivered by MDI - RDS (Group I) and Nebulization - NSDS (Group II). Data points represent mean±s.e. p<0.01% indicated by asterisk.

the study was limited to the measurement of the absolute improvement of FEV1, our results indicate that 30 minutes and 24 hours after receiving treatments, patients using NSDS showed significant improvement as compared to those using the RDS.

Previous studies have compared NSDS and MDI using spacer devices.[5] Both delivery system were found to be effective in treating acute bronchial asthma exacerbations. Morley[10] showed that the FVC and FEVl values were slightly higher with NSDS, but the difference in FEVl improvement was not significant. In contrast, our study demonstrates that the most effective albuterol delivery system was the NSDS. This could be explained by three possible mechanisms. First, it is known that the amount of medication and the site at which it deposits depends mainly on the particle size and its speed through the airways. ß-2 agonist best exert their action at the distal airways. There are 3 forms of particle deposition in the airways. The larger particles (>10 μ) deposit mainly in the upper airway. Particles between 9-2 microns depend mostly on inertia for their deposition in the peripheral airway where the ß-2 agonist receptors are increased. The smaller particles less that 2 microns depend on the brownian movement for their migration in and out the alveoli, and the therapeutic effect of these particles is minimal.[14] Most of the particles, delivered by NSDS are between 2-5 microns, and can be maintained for the 15 minutes of therapy in the peripheral airway, increasing the residence time and airway deposition.[10,15] With the breath activator metered dose inhaler although, most of the particles are less that lOμm; when this particles are exposed to high humidity, the size might increase up to 10 μm. This may increase the deposition of the particle at the upper airway with less topic effect at the peripheral airway.[16] Second, as mentioned, deposition will depend also on the speed of the particle. The speed will the depend on the patient's inspiratory flow effort. 16 In the case of NSDS the speed is given by compressed air. In RDS the patient has to develop a minimal inspiratory effort of at least 60-100 lts/min.13 Although in our patient all had a peak flow above 100 lts/min that effort was not apparently enough. A third possible mechanism is that the dose equivalence of both delivery system has not been established. In the case of MDI and NSDS the equivalency have been 5:1, howeve this ratio can vary from 15:1 to 1:1.[2] Similarly, in the RDS, the equivalency with NSDS in acute obstruction has not been established. In our study we followed the recommended dose. It is possible that using higher concentrations of the powder or decreasing the particle size, an improved drug delivery could be achieved.

Treatment acceptance by patient may alter the outcome of the drug delivery. In our study, two patients in the group I failed to accept,the RDS and were excluded from this analysis due to dissatisfaction with this method. This may be due to patients feel a higher degree of confidence with the traditional therapy. Nevertheless, significant differences between both delivery methods were observed. Our results are in agreement with previous data supporting the nebulization as the most adequate therapy in exacerbated bronchial asthma during the first 24 hours or during the critical status.[1,8] However is well established that after the critical status, MDI is as effective as the nebulizer, including lower cost.[7]

We conclude that although the dose equivalence of both delivery systems have not been established in our study, the nebulized solution was most effective during the first 24 hours of hospitalization than the dry powder. Additional studies are required to determine if increased doses of albuterol powder are effective in the first 24 hours.

Resumen: **Los objetivos de este estudio fueron comparar la eficacia de Albuterol nebulizado vs Albuterol en polvo en pacientes con asma bronquial exacerbada que requerían hospitalización. Pacientes con un historial de asma de acuerdo con los criterios establecidos, fueron incluidos en este estudio. De enero a mayo de 1990, estos pacientes se reclutaron y se asignaron a dos grupos al azar. Grupo I se le administró Albuterol en polvo con una concentración de 200μg cada 4 horas. El Grupo II recibió Albuterol nebulizado en solución a una concentración de 2.5 mg cada 4 horas. La capacidad,vital forzada (FVC) y el volumen expirado en un segundo (FEVl) se midieron con un transductor diferencial de presión, a la admisión, a los 30 minutos y a las 24 horas después del tratamiento. El FEVl absoluto fue calculado y los resultados fueron analizados por medio de las técnicas de student y Fisher y el valor de significancia se estableció en p> 0.01%. Quince pacientes se incluyeron en ambos grupos y dos pacientes del grupo I se excluyeron del experimento debido a que no deseaban continuar bajo terapia. Ambos grupos resultaron parecidos en relación a sexo, exacerbaciones por año, historial de fumar y tiempo de hospitalización. Sin embargo, se demostraron diferencias significativas cuando comparamos el FEVl absoluto de ambos grupos. El promedio y la desviación estándar para el grupo I en los primeros 30 minutos fueron de 0.42±0.08 lts. En el grupo II fueron de 0.65±0.06 lts. A las 24 horas, el grupo I demostró 0.16±0.2 lts mientras que el grupo II presentó 0.30±0.7 lts con un valor de p>0.01. En base a estos resultados, concluimos que, a pesar de que no se estableció la equivalencia entre ambos sistemas, las soluciones de**

Albuterol nebulizadas son mas efectivas durante las primeras 24 horas de hospitalización que el aerosol en polvo.

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Severe Autoimmune Hemolytic Anemia Associated With Pneumococcal Bacteremia

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Summary: **Acquired autoimmune hemolytic anemia frequently occurs in an individual with a deranged immune system. This impaired immune system can also predispose the patient to infections with a wide range of organisms. Also, it is known that certain infectious organisms can induce immune hemolytic anemia in normal hosts by diverse mechanisms. When autoimmune hemolytic anemia presents concomitantly with infection, it is extremely difficult to establish the etiology of the condition. We present a case of severe autoimmune hemolytic anemia of the warm antibody type associated with pneumococcal sepsis in which both the infectious process and the hemolysis are probably secondary to an altered immune system.**

Introduction

The relationship between infection and autoimmune hemolytic anemia, especially of the warm antibody type, has been widely established in the medical literature(1). However, it is very difficult to evaluate if the infectious disease is the etiology of the autoimmune phenomenon or merely a coincidental manifestation in a patient with a deranged immune status(2).

Infectious agents may induce an immune hemolytic anemia by several mechanisms, such as formation of cross reacting antibodies, hapten formation, denaturation of the erythrocyte surface, creation of a state of innocent bystander, adsorption of immune complexes and others(1). Also, the infectious agents could create an immunocompetent cell, as suggested in infectious mononucleosis(3).

Dacie found 23 patients with an infectious history in a series of 175 cases of autoimmune hemolytic anemia(4). A wide variety of organisms have been implicated in other series, such as viral (influenza, hepatitis, herpes, Cytomegalovirus, infectious mononucleosis, measles), bacterial (Mycoplasma, Bartonella, Clostridium, Streptococcus, Enterococcus, Staphylococcus, etc.), fungal (Candida, Aspergillus) and parasitic infections (Strongyloides) (1).

The clinical course of the patients with an infectious disease and positive antiglobulin tests is highly variable. The disease can present in an explosive fashion with an acute hemolytic crisis, but seldom led to death, and complete recovery is frequent with correction of the infectious state (5).

Singer and Dameshek noted the association between a type 17 pneumococcal pneumonia and autoimmune hemolytic anemia(6). We will report a recent case of severe autoimmune hemolytic anemia that presented with pneumococcal bacteremia.

Case Report

A 57 year old security guard without history of systemic illness was admitted due to high fever (40° C) of three day evolution, a left lower lobe bronchopneumonia and macrocytic anemia. The patient had no history of use of alcohol or illicit drugs, cigarette smoking, recent travel outside the country, promiscuity or homosexualism. He had vitiligo over his hands and face; there was no lymphadenopathy or visceromegaly. Initial laboratory workup revealed an hemoglobin of 5.4 g/dl, 14.3% hematocrit, 108.3 fl MCV, 55800 WBC count, reticulocyte count 33.7%, 247000 platelets, LDH 1272 U/L (normal 313-618), total bilirubin 18.7 mg/dl, conjugated bilirubin 11 mg/dl, alkaline phosphatase 196 U/L (normal43-122), AST 98 (normal 5-37), globulins 3.1 mg/dl (normal 1.5-3.5). Peripheral smear showed toxic granulations in neutrophils, shift to the left, marked polychromatophilia, anisocytosis, poikilocytosis and nucleated red blood cells.

Blood cultures and a sputum culture were positive for growth of **Streptococcus pnemonia.** Immunohematology studies revealed that the patient had an O Rh pos ABO blood group, probable Rhesus genotype R1R2(DCe/DcE). Direct and indirect antiglobulin tests (Coombs) were strongly positive (IgG, C3D, elution test). It was concluded that the patient had a warm autoantibody of undetermined specificity.

The patient was treated with Penicillin G 2 million units IV every 4 hours, intravenous gammaglobulins 28 grams for 2 days, Methylprednisolone 80 mg IV every 8 hours, Folic acid 1 mg three times a day and two units of the most compatible blood were transfused. He improved rapidly and ten days after admission had an hemoglobin of 9.5 g/dl, reticulocyte count 17.2%, 28.7% hematocrit, 12000 WBC count, LDH 724 U/L, total bilirubin 3.3 mg/dl.

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The patient was discharged home in Prednisone 60 mg po daily and two months later his direct and indirect antiglobulin tests were still positive with an hemoglobin of 15.2 g/dl and reticulocyte count of 3.1%. One month later after the Prednisone was discontinued, the patient was asymptomatic but his hemoglobin decreased to 12.4 g/dl, hematocrit 36.7% with a total bilirubin of 2.3 mg/dl. His platelet count also decreased to 54000. A bone marrow aspiration was consistent with peripheral platelet destruction and erythroid hyperplasia. The patient was restarted in Prednisone 60 mg every day and one week later had an hemoglobin of 13.3 g/dl and platelet count of 312000.

In view of the development of thrombocytopenia, a direct antiplatelet antibody test was performed which was positive for a platelet associated immunoglobulin of the IgG class. An antinuclear antibodies test (ANA) was also positive in 1:80 dilution with a peripheral pattern. However, other tests for active systemic lupus erythematosus or other collagen-vascular disease, such as immune complex levels (RAJI cell), immune complex-CIQ levels, were negative. The patient had a normal complement C3 level and levels of C4 below 8 mg/dl (normal 16.3-44.7 mg/dl). Serum protein electrophoresis showed a polyclonal increase of globulins. Quantitative immunoglobulin levels were IgG 2100 mg/dl (normal 600-1765), IgA 259 mg/dl (normal 85-335), IgM 484 mg/dl (normal 45-250) and IgD not detected (normal 0-14 mg/dl).

Discussion

This case shows the association of an infectious disease (pneumococcal sepsis) with adquired hemolytic anemia due to warm reacting antibodies. A severe clinical course with rapid recovery followed after correction of the infectious state and the leukemoid reaction with high dose penicillin and with the use of intravenous gammaglobulins and steroids.

In this case, the autoimmune hemolytic anemia probably was the manifestation of an altered immune system that also predisposed the patient to pneumococcal sepsis , in view of the relapse of the hemolytic state and the development of immune thrombocytopenia that responded to high dose steroids (Evans syndrome). The physical exam (although the patient had vitiligo), history and most laboratory tests do not indicate that the patient was suffering from an underlying disorder. Lymphoproliferative and plasma cell disorders, rheumatic or collagen disease (such as systemic lupus erythematosus-SLE), neoplasia or chronic inflammatory disease (such as ulcerative colitis) have been implicated as secondary causes of autoimmune hemolytic anemia(7,8). The patient had a positive ANA test and decreased C4 levels but immune complex levels and C3 levels were normal and he had no history of joint pain or arthritis, renal, neurologic or skin disorder that usually are present in SLE or collagen-vascular diseases. However, follow up over time and a more extensive laboratory evaluation are needed to determine if this is a case of idiopathic immune hemolytic anemia (and later immune thrombocytopenia) versus the herald of a systemic disorder such as one of the above.

We are indebted to the American Red Cross Blood Services Puerto Rico Region and the Blood Bank of the Puerto Rico Medical Center for the Immunohematology studies.

Resumen: **La anemia hemolítica adquirida de origen autoinmune ocurre frecuentemente en un individuo con un sistema inmune afectado. Ese sistema inmune alterado también puede predisponer al paciente a infecciones por una gran variedad de agentes. También, se sabe que ciertos agentes infecciosos pueden inducir una anemia hemolítica de naturaleza inmunológica en huéspedes normales por mecanismos diversos. Cuando se presenta anemia hemolítica autoinmune concomitantemente con infección, es extremadamente difícil establecer la etiología de la condición. Presentamos un caso de un paciente con anemia hemolítica autoinmune severa del tipo con anticuerpos "calientes" asociada a sepsis por pneumococo en que ambos, el proceso infeccioso y la hemólisis, son probablemente secundarios a un sistema inmune alterado.**

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Surveillance, Prevention and Control of Drug Abuse in Hospitals*

Nestor J. Galarza, M.D., C.P.H.A.

Summary: **Every citizen is morally responsible to contribute to solve the drug problem in the national front. Though we may understand that the uninformed and the naive may experiment with drugs, we do not expect patients nor hospital personnel to abuse them in the treatment environment. But hospitals are also hit by the epidemic. For long we have recognized how drug abuse adds comorbidity to medical care. But abuse of drugs by hospital personnel not only alters community expectations of health care professionals but has a tremendous impact on productivity. Here I recommend specific management strategies for the surveillance, prevention and control drug abuse within the hospital environment.**

Is it not alarming that twelve percent of patients discharged from general hospitals have both a mental disorder and a substance use disorder(1)? And that drug abuse was associated with irregular discharges from a VA hospital in which not less than 61% of 113 consecutive patients had a substance use disorder(2)? Gathering these statistics on drug addiction is alarming but simple. Tackling the drug problem in the community is not that simple. And when we realizethe epidemic of substance abuse occurs also within health care organizations we know the drug problem is not a passing fad. The news of late are eloquent.

The chief of infectious diseases at a U of Wisconsin Hospital reported how a health care worker had tampered with syringes of fentanyl by replacing it with non-sterile water. Nine patients were infected with Pseudomonas picketti and three developed Gram negative bacteremia. Responsibly this physician pointed out that "the most common cause of loss of licensure for physicians, nurses and pharmacists is diversion of narcotics for personal use"(3).

At Johns Hopkins a surgeon who died of AIDS November 16, 1990 may have operated on patients after contracting HIV infection. Some 1800 patients were contacted by the hospital and offered free testing for the virus(4). These incidents exemplify how employees may contribute to nosocomial infections as a result of their drug abuse.

Effect on Health Care Workers

On the other hand, it is well known that substance abuse by hospital employees complicates personnel issues and decreases productivity (5). A prospective controlled study of 2537 postal employees showed that preemployment drug screening positive for marijuana or cocaine was associated with adverse employment outcomes such as increased turnover, accidents, injuries and disciplinary problems. It has been estimated that employees who abuse drugs have two to three times as many industrial accidents, four times as many compensable injuries and take as much as 15 times more sick leave than non-users (6). In addition, a national survey of patterns of drug use among resident physicians reported a high rate of past month use of alcohol and benzodiazepines (7). Similarly, 1.6% of medical students in their senior year believed they needed help for substance abuse. Yet they were unaware of any policy on substance abuse at their own medical school(8).

We are all aware that the federal government delegates greater drug control to the states (9) and that it has joined forces with a team of corporate leaders, the Partnership for a Drug Free America, in order to stimulate greater participation in the war on drugs(10). As a result business-men have cited the consequences of substance abuse in the workplace: an increase in the number of claims for medical benefits (74%), increased absenteeism (67%), decreased productivity (64%), more worker's compensation claims (45%), lower morale of co-workers (41%), more disciplinary proceedings (44%) and finally increased difficulty in recruiting, training, and replacing employees (34%).

Situation in the Surrounding Community

That many in the community are involved with illegal substances is an everyday experience. At 26.4 per 100,000 people in the United States the rate for hispanics infected with AIDS, one of the consequences of intravenous drug abuse, is higher than for whites (11). In Puerto Rico the rate of addiction is 2,478 per 100,000 (12) and from 45% to 59% of intravenous drug

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abusers are infected by the AIDS virus. Compared to 49 states Puerto Rico has the highest number of AIDS cases, that is, 13.1 per 100,000. Washington D.C. is the exception with 121.6 cases per 100,000 (13).

Shall we leave it to the government to tackle drug abuse in the community at large? Shall we not tackle drug abuse in a smaller community, the workplace of so many of us? Let take a look at the situation at the hospital level.

Inattention in the Hospital

Prescription drugs and substance abuse treatment programs in general hospitals are subject to accreditation surveys by the Joint Commission of Acreditation on Health-care Organizations (14). But we still give insufficient attention to the risks substances entail to patients and hospital employees. In my view, just like the sick building syndrome, substance abuse within hospitals should be in the list of environmental illnesses that are associated to mental disorders (15). However the problem is more complex than that.

That patients in general hospitals may be "infected" with substance abuse may only be a reflection of the situation in the larger community. It is the fact that well informed health-care workers themselves fall victim to drug abuse that demands a most assertive attack on the problem from within the institution.

So, if in a similar manner to nosocomial infections substance abuse has become a problem within health care organizations, can something be done about it?

Control Measures

Since its founding by Ignaz Semmelweis over 100 years ago infection control has been one of the most important quality assurance activities in hospitals. Nosocomial infections which represent 5 to 10% of admissions(16) are an important liability risk for hospitals as well as a health problem for patients and staff. The modern HIV infection in the hospital dramatically underscores such risks. The costs of nosocomial infections and the benefits of infection control programs have been subject of study (17). Entire books are dedicated to the theory and practice of infection control (18,19).

In the context of this paper "hospital epidemiology must look beyond the traditional narrow infection control responsibilities and embrace Quality Assurance and Risk Management" (20). I propose then that, by broadening its span of control into the quality assurance program, traditional infection control measures be applied to control substance abuse within health-care institutions.

The Proposed Program

Surveillance, prevention and control of nosocomial drug abuse in a general hospital at a minimum should consist of the following actions:

1. A review of all policies on the management of substance abusers, patients or staff within the organization.
2. Incorporation of relevant policies into the employee health program, occupational safety program and personnel department.
3. Creation of a Substance Control Practitioner who will coordinate compliance with these policies.
4. Establishment of a Substance Control Committee composed of one representative each from administration, psychiatry, nursing, laboratory, law, employee health program.
5. A monthly Nosocomial Addictive Drug Incident Report (NADIR) to be discussed by the Substance Control Committee. Like the format for reporting infections, it should include the attack rate and trends. The committee would report to the Quality Assurance Committee of the organization.
6. Development of a manual to describe the entire program.
7. Increased attention to the chain of substance abuse: sources, means of transmission, susceptibility of hosts.
8. A mandatory psychiatric evaluation of any patient or employee who is found to abuse drugs.
9. Referral of drug abusers to therapy and treatment with specific medications according to the drug and stage of intoxication or withdrawal.
10. Serial unannounced testing to detect drugs of abuse (21).
11. Development of a Notice of intent to leave against medical advice that patients would sign in advance to allow the organization time to decide the optimal clinical management of the drug abusing patient before discharge.
12. Referral of drug abusing patients who obtain maximum hospital benefits to drug treatment programs or residential care facilities in the community.
13. When a drug abuse incident occurs the record should be flagged to alert the Substance Control Person to monitor the case.
14. Inclusion of substance abuse events in the list of generic occurrence screens of the hospital.
15. The creation of an ongoing support group for caregivers who regularly manage drug abusers be them patients or employees.

Conclusion

We have a health, legal, and ethical responsibility to control drug abuse. We have time-proof systems to control nosocomial infections in hospitals but we are taking forever to control "nosocomial" drug abuse. Specific actions to help in the control of substance abuse in hospitals should be incorporated into the

quality assurance program using infection control reporting methods. Increased efforts to control substance abuse within all hospitals will be an important contribution to the war against drugs in the larger community.

Resumen: **Todo ciudadano tiene una responsabilidad moral de contribuir a resolver el problema de las drogas en el frente nacional. Aunque podamos entender que por ingenuidad algunas personas suelen experimentar con las drogas, no esperamos que el personal de hospital las utilize en el hospital mismo. Pero también en los hospitales hay una epidemia. Ya sabemos reconocer las complicaciones médicas del abuso de las drogas para el pacientado. Pero el abuso de drogas por el personal no solamente altera la imagen de estos en los ojos de la comunidad, sino que tiene un impacto tremendo en su productividad. Este artículo recomienda estrategias específicas para la prevención y el control de las drogas en el ambiente hospitalario.**

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21. The Fifth Circuit Federal Court of Appeals ruled against a broad challenge to random drug testing of federal employees, saying the order establishing the program is valid on its face. (NTEU v. Bush, 88-3770, December 29, 1989.). The number of federal cases and appeals in regards to drug testing support the premise of this paper that the problem of drug abuse at the worksite is growing and needs control measures from within.

Patterns in Sun Exposure and Sunscreen use Among Puertorrican Adolescents

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Summary: **A survey of 245 adolescents visiting different San Juan area beaches was conducted to determine the frequency with which they used sunscreens lotions. Seventy-two percent of the teenager in the survey stated that they spent most weekends in the sun; however, only 68% always used sunscreen, while 31% never did. Prevalence factors found to be associated with the sunscreen use included male sex (odd ratio =1.01 $P < 0.01$), having a friend who routinely used the lotion (odds ratio = 0.06, $P < 0.05$), and having parents who strongly recommend the sunscreen use, (odds ratio = o.g, $P > 0.05$). This survey substantiates poor compliance with sunscreen lotion use by teenagers despite increasing evidence of the dangers of sun exposure.**

Introduction:

Recent epidemiologic studies indicate that more than 90% of basal and squamous cell carcinomas can be attributed to exposure to ultraviolet light (Report by the Committe on Chemistry and Physics of Ozone Depletion, 1987). Exposure to sun is the principle cause of ultraviolet light and the principle cause of cause of skin cancer reported among white population worlwide [2]. The effectiveness of sunscreens in reducing ultraviolet light exposure in humans is well established [3;4]. The potential benefits of using a sunscreen would reduced the incidence of skin cancer significantly [5]. It is estimated that 80% of a person's lifetime sun exposure occurs before 21 years of age [6], so the potential health benefits of sunscreen use during childhood and adolescent should be studied. The benefit of sunscreen use during childhood and adolescence has not received the attention it deserves as part of preventive health care. In view of this information, we decided to study the use of sunscreens, by the adolescent population attending the beaches of the San Juan area. We decided to investigate the frequency they used the sunscreen, exposure habits, their knowledge about sun exposure and susncreen; and their use of sun-protective agents.

Methods:

A questionnaire was distributed to adolescent patients aged 13 to 18 years old attending beaches in the San Juan area. Adolescent were asked to participate voluntarily. Tourist were excluded, and all participants were white puertorrican.

The study was conducted from November 1991 through March 1992. The survey form utilized consisted of 10 questions, including age, sex, an estimate of skin type based on ease of sunburn, the use of sunscreen or reasons why it was not use, time spent in the beach, and number of blistering sunburns. The occurence of skin cancer in the family and visits to tanning parlors were not surveyed.

Data was entered using the Epiinfo computer program and analyzed by program SPSS statistical package. Results were analyzed for percentual distribution and the relationship between use, age, sex and patterns of use were analyzed using the X^2 test. A P value of ≤ 0.05 was considered significant. Odds ratios were calculated as the basic measure to the degree of association. The odds ratio approximates the relative risk.

Results:

The survey form was completed by 245 adolescents. Ages ranged from 13 to 18 years (mean age 15.5 years). There were 121 males and 124 female. Among the total population surveyed, 68% (N=169), always used sunscreen, while 31%, (N=76), neved did. Table I demonstrates the frequency of sunscreen use by age groups. For both group there was no significant difference in their pattern. $X^2 = 0.82$ $P > 0.05$).

TABLE I.
Frequency of sunscreen use by age group

Age	Users	Non-Users	P Value
13 - 15	71	35	NS
16 - 18	98	41	NS
Total	**169**	**76**	**NS**

$p > 0.05$

When each sex group was analyzed separatedly, we observed that of those who use sunscreen, 50% were male and 49% were female. ($X^2 = 0.16$ $P > 0.01$). Statistically this was not significant. (Table II).

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TABLE II.

Frequency of sunscreen use by age groups and sex

	Age 13	14	15	16	17	18	P Value
Sex	12	8	11	11	17	26	NS
Male	15	12	13	10	17	17	NS
	27	20	24	21	34	43	

p > 0.01

Table III shows the results of the descriptions of their skin type. Most of the responders, 37.6% (N = 92), described that they burned and tanned easily, (37.6%), and only 11.4% (N=28), described themselves as resistant to sunburn.

TABLE III.

Frequency of reported skin types

Skin Types	No.	%
"Always burns, never tans"	48	19.6
"Burn easily, tan easily"	92	37.6
"Sometimes burn, always eventually tan"	77	31.4
"Never get a sunburn, my skin is dark"	28	11.4
TOTAL	245	100.0

Among our study group who use sunscreens, and their sun exposure habits, 46% (N=78) said they spent more than fours hours in the sun when they visit the beach (Table IV). Table IV-a. demonstrate that 38.2%, (N=29), of those who do not use the blockers spent more than four hours in the sun. When both groups were compared based on time exposed and their pattern in using the sunscreen, no statistical significant was observed. ($X^2 = 1.36$ $P > 0.05$)

TABLE IV.

Estimated sun exposure among sunscreen users by one visit to beach

% of time exposed	No.	%	P Value
Less than 2 hours	51	30.1	NS
2 - 4 hours	40	23.6	NS
More than 4 hours	78	46.2	NS
TOTAL	169	100.0	

Table V describes the different patterns of sunscreen use among our study group. When asked how often they used sunscreen, 40.2% (N= 68), said they used it "only when they arrived to the beach", 27.8% (N=47) said "before going into water", 29.5%, (N=50), reported "each time I come out of water" and 2.3% (N=4), said "I always forget to use it".

TABLE IV-a.

Estimated sun exposure among non-screen users by one visit to beach

% of time exposed	No.	%	P Value
Less than 2 hours	26	34.2	NS
2 - 4 hours	21	27.6	NS
More than 4 hours	29	38.2	NS
TOTAL	76	100.0	

p > 0.01

TABLE V.

Distribution of sunscreen use patterns

Pattern	No.	%
"Upon arrival to beach, and then I do not use it again"	68	40.2
"Before going into water"	47	27.8
"Each time I come out of water"	50	29.5
"I always forget to use it"	4	2.3
TOTAL	169	100.0

Table VI summarizes the factors found to be associated with sunscreen use. Odds ratios for sunscreen use was calculated for each factor. In general, males were more likely to use sunscreen than females (odds ratio 1.01). When sunscreen was encouraged by parents, teenagers were not more likely to use sunscreen (odds ratio = 0.9). Adolescents who spend less time under the sun are most likely to use sunscreen than those who indicated long exposure (odds ratio 1.17) A friend who routinely used sunscreen did not increase the chances that a teenager would use a sunscreen (odd ratio = 0.06)

TABLE VI.

Factors associated with sunscreen use

Factor	%	ODD'S ratio	P Value
Sex			
Male	50.2	1.01	P<0.01
Female	49.7		
Parental insistence			
Yes	27.2	0.9	P>0.05
No	72.8		
Estimate of maximum safe sun exposure			
< 2 hours - 4 hours	53.7	1.17	P<0.01
> 4 hours			
Use by friends			
Yes	33.7	0.06	P>0.05
No	66.3		

Discussion

Clearly, there is still a need for education in the area of sun exposure, attitudes and sunscreens. Many people spend a considerable amount of time exposed to the sun and no protection is adequately instituted. While the epidemic of skin cancer is alarming, the use of sunscreens can reduce a persons' lifetime risk of developing skin cancer by 78% [7]. The role of sunlight as a risk factor in the development of cancer is controversial and the action for any such effect is unknown. If ultraviolet light in part, contributes to the risk associated with childhood sunlight exposure, adolescent use of sunscreen could reduce the cancer risk[8].

Our findings suggests that sunscreen use during adolescent years varies substantially. Different attitudes and patterns in their use are observed among our surveyed.

The results of this study suggest that sunscreen use during adolescent is not appropiate. Only 50.2% of males and 49.7% of females use the sunscreen, but the older adolescents, (N = 98), use the sunscreen more frequently than the younger adolescent (N =71). These findings are somewhat different from a 1985 survey done at the Adolescent Clinic of the Children's Hospital Medical Center in Boston, Massachusetts, where two thirds of the patients reported using a sunscreen.

Of particular concern is that the female teenager is using lotion less frequently than the males. These findings oppose the results of the study "Sunscreen use and sun exposure" [10]. Despite the observed no statistical significance, a trend in this group should be distressing.

In general the risk of skin cancer is highest in whites and increases with increasing socioeconomic status[10]. Our mixed hereditary background and our different skin types focus our classification as white puertorrican with limited generalization.

Our population clearly shows more tendency of using the sunscreen if more than 4 hours are spend in one visit to beach but the frequency of using sunscreen presents different patterns. This group did not differ significantly from those non users ($X2 = 1.36$ $p > 0.01$)

Adolescent in our study were not more likely to use sunscree if their parents had insisted, neither if one friend used sunscreens. These important associations could be modified if parental attitudes toward sun exposure change and if pediatricians promote sun safety issues as part of their anticipatory guidance in all families.

Obviously our population is not using adequately the sunscreen lotion and use them in different ways. Only 2.3%, (N= 4), never use the lotion. While the sample size in this survey is small, it does suggest that our adolescent use the lotion but not correctly. If the hazards of overexposure to sunlight is directly proportional to time exposure, our findings should alarm our medical population.

In general this study suggests that increased education of teenagers is neccesary.

Since 80% of lifetime sun exposure occurs before the age of 21 years, pediatricians should be leaders in the education of their patients and their patients' parents about the risks of sun exposure. Definitely change can be effected through education.

Resumen: **Una encuesta de 245 adolescentes que frecuentan las diferentes playas de San Juan se realizó para determinar la frecuencia del uso de bloqueadores solares. 72% de los adolescentes en la encuesta informaron que frecuentan las playas la mayor parte de los fines de semana, sin embargo sólo un 68% utilizan el bloqueador. Un 31 % de los encuestados reportan que nunca lo utilizan.**

Factores prevalentes asociados con el uso lo fue el ser masculino, (riesgo relativo = 1.01, p< 0.01). El tener un amigo quien rutinariamente use la loción, (riesgo relativo estimado =0.06, p> 0.05), y tener padres quien frecuentemente recomiendan el uso del bloqueador, (riesgo relativo estimado = 0.9, p>0.05), no aumentan la posibilidad de uso. Esta encuesta substancialmente establece la pobre utilización de las lociones por los adolescentes a pesar de los daños evidentes de la exposición al sol.

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Basal Cell Nevus Syndrome and Medulloblastoma: A Case Report

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Summary: **The basal cell nevus syndrome (BCNS) is a rare autosomal dominant disorder characterized by multiple nevoid basal-cell carcinomas of the skin, recurrent odontogenic keratocysts, skeletal anomalies, developmental malformations, and the predisposition to other neoplastic processes. Among the well known relationships of the syndrome with cancer is that of medulloblastoma. The first known case of BCNS with medulloblastoma in Puerto Rico is presented.**

Introduction

The basal-cell nevus syndrome (BCNS) was recognized more than 30 years ago by Howell and Caro, and Gorlin and Goltz and has been the subject of extensive clinical and laboratory investigations. The major diagnostic criteria for the disease are multiple basal cell carcinomas with an early age of onset, epithelium-lined cysts of mandible and maxilla, distinctive pits in the hands and feet, congenital skeletal anomalies, and ectopic calcifications. In the absence of a positive family history, any two major components may be sufficient for diagnosis. The syndrome has been associated with an increased susceptibility to various other neoplasms, especially medulloblastoma. We report one case of BCNS in association with medulloblastoma.

Case Report

Our patient, then a 21-month old boy, was evaluated for a sudden onset of ataxia. A CT scan of the head demonstrated a posterior fossa tumor that was resected and showed to be a medulloblastoma. He received a course of radiotherapy for eight weeks and was discharged home. At age 5, the child presented various pigmented basal-cell nevi on his neck and back (Fig. 1 and 2). At about the same time, the patient was readmitted with increased intracranial pressure, and a ventriculoperitoneal shunt was put in place. No evidence of tumor recurrence was found. The boy has remained in fairly good health since then. At age 14, radiographic examination of the whole skeleton demonstrated a lamellar-type calcification of the falx cerebri (Fig. 3), a mandibular cyst (Fig. 4), mild thoracic scoliosis (Fig. 5), and a short metacarpal index of the hands (Fig. 6). The mandibular cyst was resected and found to be an odontogenic keratocyst. In addition, the patient suffers from bilateral cataracts, strabismus, and a lower than expected IQ for his age. Family history revealed that the patient's father had a solitary basal cell carcinoma surgically removed at age 35.

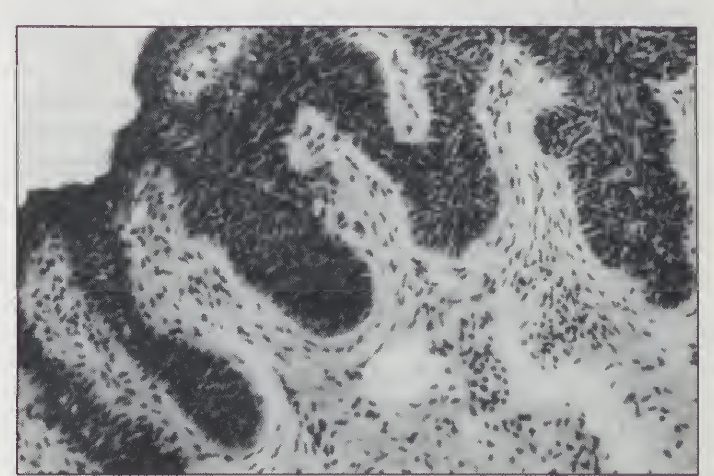


FIG. 1



FIG. 2

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FIG. 3

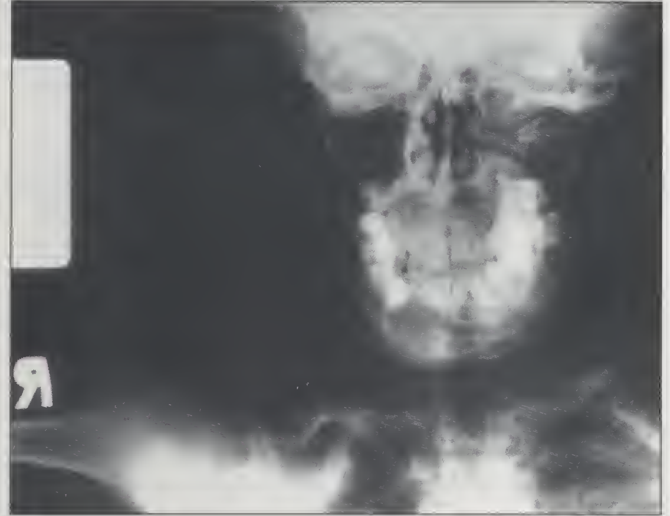

FIG. 4


FIG. 5


FIG. 6

Discussion

A total of 33 cases of BCNS complicated with medulloblastoma have been reported in the literature. Our case is the first one reported in Puerto Rico. Ramos and Alfonso reported the first cases of BCNS in Puerto Rico, but their patients did not have medulloblastoma.

Medulloblastoma in BCNS presents certain uncommon characteristics. Patients are generally males, with onset of disease at an early age and with a rather benign course of the disease.

Chan et al., reported that about 20% of BCNS gene carriers develop brain tumors in early childhood. Although the exact cause of this relationship has not been elucidated, Howell proposed genetic and environmental factors in oncogenesis in the BCNS. He stated that individuals with BCNS represent a special subgroup with a hereditary predisposition to basal cell carcinoma in whom ionizing radiation may supply the subsequent mutation necessary for tumor development. Please note that florid basal cell carcinomas are more prominent in the radiation port used in treating medulloblastomas with radiotherapy. This was true in our case and Howell has suggested that this may represent an environmental factor, i.e. ionizing radiation of oncogenesis in the BCNS.

Recently, the hypothesis that BCNS is caused by mutation in a tumor supressor gene on chromosome 9, which plays an important role both in normal development and in the growth control of precursor cells for basal cell carcinomas and other tumors, has been propose by Gailani et. al. They state that the gene appears to function in different tissue types in the postnatal period as reflected by abnormalities of skin (basal cell carcinomas, palmar pits), ovary (fibromas), and hindbrain (medulloblastoma). This aspect presented by Gailani et al. represents a genetic factor of oncogenesis in the BCNS.

Conclusion

The BCNS is an unusual disease with a myriad of manifestations. Recognition of its frequent association with other malignant processes must alert the physician to be aware of atypical presentations in patients with the syndrome.

Resumen: **El síndrome de carcinomas basocelulares nevoides es una condición autosómica dominante rara que se caracteriza por múltiples carcinomas basocelulares de la piel, quistes mandibulares, anomalías esqueletales, malformaciones del desarrollo y la predisposición a procesos neoplásticos. Entre los procesos cancerosos más reconocidos está el del meduloblastoma. El primer caso en Puerto Rico de la asociación entre el síndrome de carcinomas basocelulares nevoides y meduloblastoma es presentado en conjunto con un repaso de la literatura.**

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Artículos Especiales:

El Centro de Tratamiento Diurno:

Su Origen e Impacto en los Servicios de Salud Mental para Niños y Adolescentes

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Resumen: **Se describe el origen, las filosofías y objetivos de los Programas de Tratamiento Diurno para niños y adolescentes. Se explica sobre el inicio de estos programas en la población de niños en Puerto Rico. Se presenta revisión de la literatura sobre las ventajas/beneficios y efectividad de esta modalidad de tratamiento y sus futuras implicaciones en la planificación de servicios de salud mental para niños y adolescentes en Puerto Rico.**
Palabras Claves: Tratamiento Diurno, Impacto, Niños/ Adolescentes.

Origenes:

Se dice que los primeros programas de Hospitalización Parcial que surgieron eran dirigidos a la población de adultos y surgieron en Rusia en los años treinta (30), más adelante en Canadá (finales de la década del 40)y en Inglaterra para los comienzos de la década del 50. Se cree que la Clínica Meninger introdujo este concepto como modalidad de tratamiento psiquiátrico en los Estados Unidos a mediados de la década del 50[1].

En los Estados Unidos,la existencia de los programas de tratamiento Diurno para niños con desórdenes mentales ha sido corta. Hay quienes ubican los comienzos allá para el año 1943 [2]. Aunque durante los primeros 20 años hubo poco crecimiento en cuanto al número de centros, el concepto de tratamiento diurno fue reconocido como la innovación más significativa en el cuidado clínico en este siglo (Joint Comission on Mental Health, 1961).

Con la sofisticación que se fue logrando del manejo de pacientes en el ambiente hospitalario se empezó a ver la necesidad de estrategias intermedias entre la hospitalización y el Servicio Ambulatorio; fue así que Connell [3] desarrolló una Unidad Hospitalaria Diurna para Niños.

En el 1963 el Acta de Centros de Salud Mental en la comunidad hizo mandatorio los servicios comprensivos para niños y adolescentes incluyendo la hospitalización parcial. Esto dió lugar a la proliferación de este tipo de programa para la población de niños y adolescentes contando para 1963 con 10 centros;ya para 1972 con 60 centros [4] y en el 1989 con aproximadamente 1,300 Centros [5].

En Puerto Rico la idea de ofrecer Servicios de Salud Mental a niños.a través de un Centro de Tratamiento Diurno ha sido limitada. Se remonta allá para el año de 1964 cuando se organizó por primera vez un programa con la colaboración del Departamento de Salud y la Escuela de Medicina dentro de una pequeña Clínica Externa de Niños y Adolescentes que se había organizado para el año 1960 y fue dirigido a pacientes entre 4-7 años de edad(aunque llegó a atender a pacientes hasta los 9 años). El paciente asistía al Centro en diferentes horas y días para sus actividades terapéuticas donde se incluía terapia de juego y farmacología [6].En el 1965 el Centro pasó a incorporarse a la Escuela de Medicina Departamento de Psiquiatría, cerrando servicios en 1970.

Esta modalidad de tratamiento resurge para el año 1981 bajo la dirección del Departamento de Psiquiatría de la Escuela de Medicina en una colaboración estrecha entre el Departamento de Salud, diferentes agencias e Instituciones de Puerto Rico y Personal del Hospital Pediátrico Universitario con el eventual apoyo de un grupo cívico de la comunidad. Mantuvo sus servicios hasta el 1984. Más adelante reabrió sus puertas en julio de 1986 y ha continuado un nuevo enfoque de servicio como programa adscrito a la Secretaría Auxiliar de Salud Mental.

Definición:

El Tratamiento Diurno es una modalidad específica dentro del concepto de cuidado continuo del paciente ofreciendo servicios más intensivos que a nivel ambulatorio sin llegar a incurrir en los efectos iatrogénicos de la Hospitalización [1]. Se considera como la forma más utilizada de alternativas de servicio dentro del concepto abarcador de Hospitalización Parcial, defendidas por el Task Force de Hospitalización Parcial (1980) como:

> Un programa de tratamiento ambulatorio que incluye las modalidades más importantes de diagnóstico y tratamiento, médico, psiquiátrico, psicosocial y prevocacional (educacional) designado para pacientes con serios disturbios mentales y que requieren tratamiento intensivo multidisciplinario completo y coordinado el cual no se provee en un ambiente terapéutico ambulatorio. Permite un programa de tratamiento más flexible y menos restrictivo al ofrecer una alternativa al tratamiento de hospitalización (pág.9) [7].

Pruitt & Kiser [1] lo describen como un programa que provee tratamiento a tiempo completo (6-8 horas/día, 5 días a la semana). Se debe hacer claro que no es un centro de cuidado diurno; ni una Escuela Terapéutica, ni cuidado 24 horas de hospital ni tratamiento ambulatorio[8,9]. Cuando hablamos de Centro de Cuidado Diurno nos referimos al servicio que se ofrece a niños entre 2 1/2- 5 años de edad que sustituye el cuidado que tendría este niño en su hogar o le provee actividades que facilitan o estimulan destrezas

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del desarrollo. Esta idea de los Centros de Cuidado Diurno surgió cuando se vio la mujer en la necesidad de contribuir al recurso económico de su hogar trabajando fuera de éste.

Por otro lado, el concepto de Centro de Tratamiento Diurno conlleva una orientación de tratamiento de acuerdo a las necesidades de niños o adolescentes con disturbio emocional o enfermedad mental. En el Centro de Cuidado diferente al de Tratamiento Diurno, no se considera el concepto de cambiar el funcionamiento de una persona en este caso de los niños, sino el de mantener cierto nivel de funcionamiento.

El Centro de Tratamiento Diurno es único y se basa en la red de relaciones de las agencias y las demandas por servicio. Por su filosofía funciona estrechamente con el sistema social de donde se reciben los pacientes en la mañana y a donde se integra en las noches[10]. Esto hace necesario que toda actividad que se realice en la Unidad o Centro de Tratamiento Diurno se base en la realidad del mundo exterior al cual se regresa cada paciente.

Según Levy[11] hay 5 elementos que componen la esencia de un programa de Tratamiento Diurno:

1. Una filosofía de tratamiento u orientación teórica en los cuales se basan las intervenciones terapéuticas utilizadas.
2. Un personal encargado del llevar a cabo las actividades terapéuticas.
3. La comunidad del Centro: el personal y los pacientes.
4. El ambiente: específicamente las relaciones entre las diferentes formas de tratamiento a lo largo de la continuidad del cuidado psiquiátrico.

¿Qué facilitó el crecimiento por la aceptación de esta modalidad de tratamiento?

Zimet & Farley[2] enumeran varias razones para ésto:

1. Se reconoce la desventaja de tener que separar los niños de sus familias y su comunidad cuando el paciente está hospitalizado en una facilidad por 24 horas; conllevando a fomentar más dependencia de parte del paciente del hospital, alterando la unión familiar y sus lazos con sus padres y la comunidad, estigmatizando la familia, etc. Además la hospitalización a tiempo completo conlleva la exposición a diferentes grupos profesionales que cambian durante el turno de 24 horas.
2. La necesidad de un ambiente diurno terapéutico más intensivo para aquellos pacientes que no estaban respondiendo a otros ambientes y/o modalidades de tratamiento que se proveen en la comunidad.
3. Legislación en los Estados Unidos por varios Estados como Texas y Connecticut que promulgaron cubierta médica mandatoria para niños ubicados en esta facilidad de tratamiento y se ha comparado los otros centros de éstas versus la hospitalización por 24 horas; indicándose que el costo por tratamiento diurno puede salir en 1/4-1/2 del costo por cuidado en una facilidad residencial.

El Centro o Unidad Diurna dirige sus servicios a un grupo de pacientes con Disturbio Emocional que puede variar en severidad y de acuerdo al grado de severidad variará la intensidad y regularidad de la intervención clínica.

En nuestra cultura parece ser más aceptada la idea de una Unidad Diurna que la hospitalización entendiendo que nuestros lazos interpersonales/familiares apoyan la idea de que el menor permanezca más en su ambiente familiar. (Aunque esta autora no tiene conocimiento de estudios que corroboren esta impresión la experiencia clínica sí la respalda). El menor con Disturbio Emocional puede representar para su familia el resultado de una dinámica familiar que esté aferrada a un sentido de culpa y/o vergüenza. Tal vez ésto explicaría el que por muchos años se halla tratado de mantener a estos miembros del hogar "dentro del hogar pero aislados del resto de la sociedad" y ajenos en muchos casos a los sistemas de servicios clínicos. Por esta razón esta modalidad de tratamiento deberá ser más fortalecida en recursos y llevada a mayor número de facilidades de Salud Mental de la comunidad.

Durante los últimos 5 años; la experiencia de este tipo de modalidad en Puerto Rico ha sido limitada pero fructífera. Por un lado ha facilitado la integración de agencias que ofrecen ser vicios de familia y/o pacientes visualizando al menor como un ser en evolución y cuya formación psicosocial depende de la interacción entre él, su ambiente familiar y la comunidad en que se desenvuelve. (Este material clínico será presentado en otro artículo).

Filosofías de Tratamiento:

Hay diferentes orientaciones teóricas que pueden utilizarse al establecer un programa de tratamiento diurno. Las orientaciones pueden diferir en cuanto a la manera en que se conceptualiza al paciente (niño}, su(s) problema(s) y el programa de tratamiento.

Entre las orientaciones teóricas Pruitt et al[1] hablan de las siguientes:

I. Orientación Conductivista:

El propósito de ésta es enseñar conducta aceptable/deseable y eliminar (extinguir) la no deseada. Se dice que cerca de 1/3 de los programas de tratamiento diurno en una encuesta nacional realizada utilizan esta orientación[12]. Aquí se trata de premiar o reforzar la conducta deseada.

II. Orientación Psicoanalítica:

En esta orientación se basan en estructurar un ambiente terapéutico donde se da una conducta que pueda ser analizada. Los factores psicoanalíticos básicos de los programas con esta orientación son: interpretación del contenido inconsciente y latente del comportamiento; enfatizar las relaciones y los conceptos de transferencia y contratransferencia y el proveer un ambiente contenido que funcione como un lugar seguro (Kiser et al, reportan que hasta un 5.6% de los programas utilizan este enfoque.[12]

III. Orientación Psicoeducativa:

Utilizan el salón de clases como la estructura básica para diseñar el programa de tratamiento. Un terapista está siempre disponible para ayudar al estudiante que tiene problemas en el salón de clases, utilizando un enfoque en los conflictos interpersonales y los sentimentales.

IV. Sistemas:

Se utiliza el concepto de los diferentes aspectos de la vida del niño o adolescente que impactan en su funcionamiento: el aspecto biológico, intrapsíquico, familiar, pares, escuela, trabajo, reuniones, la iglesia.

Se reporta que un 15.49% de los programas reportaron estar funcionando con esta perspectiva de sistemas[12].

V. Modelo Médico:

Este modelo incluye dos aspectos programáticos significativos: (a) El director del programa es un psiquiatra

de niños que entre otras funciones provee supervisión clínica y de los aspectos administrativos del Programa, (b) todos los pacientes reciben diagnóstico individual y el tratamiento lo ofrece el médico.

Objetivos:

Los objetivos que puede tener un Centro de Tratamiento Diurno, según Evangelakis[10], pueden ser expuestos o planteados de maneras diferentes tomando en consideración: cómo los profesionales definan o conceptualizan esta modalidad de tratamiento, la estructura teórica y los sistemas de valores. Teniendo presente estas diferencias se pueden enumerar algunos de los objetivos que puede tener un Programa de Tratamiento Diurno. Primero se habla de esta modalidad de Tratamiento como la alternativa a una hospitalización para niños y adolescentes que se enfrentan a una crisis emocional que no amerita un cuidado intensivo de 24 horas. La Unidad Diurna en este caso se podría ver como un ambiente terapéutico que puede proporcionar una experiencia gratificante para el paciente dentro de un ambiente que no solo provee tratamiento psiquiátrico individual directo sino una situación controlada que deberá facilitar unas vivencias benignas y positivas. El paciente deberá ver la Unidad o Centro como un ambiente cuyos profesionales capacitados le ayudarán a buscar alternativas más saludables para enfrentarse a sus problemas.

Un segundo objetivo presentado por Evangelakis[10] es el ver el Centro de Tratamiento Diurno como la alternativa donde en conjunto con la familia, el paciente y el personal de la Unidad; se trata de identificar y resolver los conflictos del paciente y los enfrentados dentro del ambiente que le rodea. Este enfoque pretende no seguir perpetuando el rol de "paciente" ni personal de la Unidad como personas a cargo del cuidado del menor sino más bien como terapistas que facilitarán una extensa evaluación diagnóstica,del paciente como de su familia; de manera que se pueda lograr la salud mental y la aceptación social como una alternativa de vida más satisfactoria.

Otro objetivo para esta modalidad de Tratamiento lo es el de "Proveer tratamiento psiquiátrico diurno y educación a niños y adolescentes con disturbio emocional, bajo la supervisión de un psiquiatra de niños el cual trabaja con un enfoque de Equipo Interdisciplinario"[10]. Esta orientación general de una Unidad Diurna está basada mayormente en los conceptos psicodinámicos de diagnóstico y tratamiento que son utilizados. Aquí el tratamiento consiste de psicoterapia a nivel individual y grupal; trabajo social en grupo, actividades de terapia, terapia de familia y farmacoterapia. Bajo este enfoque, los adolescentes reciben con más énfasis, servicios de farmacoterapia y terapia de grupo como también consejería, instrucción/orientación prevocacional y vocacional. El tratamiento ayuda a desarrollar destrezas sociales y relaciones interpersonales, los cuales a su vez impactan los procesos intrapsíquicos. En este modelo un grupo de profesionales no-médicos forman un grupo vital que se envuelve en la evaluación y tratamiento activo de los pacientes, utilizando al psiquiatra como consultor y supervisor de la Unidad. El tratamiento individual se organiza de acuerdo al entendimiento que tiene el equipo de las necesidades del paciente. Los síntomas y el comportamiento del paciente se entiende que están basados en los conflictos intra e interpersonales que el paciente está experimentando en ese momento. En este enfoque aunque el personal asume una posición autoritaria; no se enfatiza el uso de fármacos ni el uso de técnicas de aislamiento, (ej.:"time out", cuarto de aislamiento).

Una cuarta conceptualización de esta modalidad de tratamiento concibe a una Unidad Diurna como: una modalidad de tratamiento en la forma de "mileu" como herramienta terapéutica efectiva en la modificación de conducta sintomática o anormal. En este enfoque se visualiza que el niño con disturbio emocional no puede ser tratado en un ambiente permisivo y por lo tanto se utiliza la estructuración de un programa de actividades, la supervisión intensa y restricciones para las infracciones cometidas. Se cree en la filosofía del ego y que en el paciente severamente afectado su ego está tan afectado que no le permite utilizar los recursos disponibles a su alrededor. Por lo tanto al inicio del tratamiento; la participación del paciente es menos activa hasta tanto comience a fortalecerse su ego. En este programa las actividades en grupo facilitan el que los pacientes reaccionen de una manera más socialmente aceptable dentro de unos controles firmemente establecidos. Bajo esta filosofía se percibe la patología del paciente como el resultado de la interacción, entre los factores biológicos, los ambientales y los padres. El paciente generalmente se admite y se observa por lo menos 2 semanas. La información luego es organizada y se hace una presentación del diagnóstico y planes del tratamiento del paciente bajo la dirección del psiquiatra; pero este concepto requiere la implementación del concepto de trabajo interdisciplinario de equipo.

Otro objetivo que se ha ofrecido para el tratamiento en un Centro Diurno lo es el de proveer un programa y currículo escolar elemental y de escuela intermedia bastante completo a pacientes bajo cuidado psiquiátrico. A cada niño se le ayuda a desarrollar al máximo sus capacidades para la comunicación, ayuda y manejo propio, destrezas sociales, la adquisición y utilización adaptativa del conocimiento, etc. Se utiliza la organización y expectativas claras y firmes en el salón de clases para estimular más efectivamente el desarrollo cognoscitivo y social del paciente. En este ambiente académico dentro de la modalidad de tratamiento de Unidad Diurna se percibe a la maestra(o) como el responsable de crear una atmósfera lo más cómoda posible. Se requiere tener firmeza y entender claramente las necesidades de estos pacientes para poder estructurarlos y motivarlos para el aprendizaje.

También se ha sugerido que el programa de Tratamiento Diurno pueda proveer: consejería a padres y terapia de familia a los padres de los niños y adolescentes. En este caso se dirige el enfoque a mejorar su posición como padres; asumir posiciones claras y firmes mejorando eventualmente la relación entre padres e hijos. Esto requiere la participación activa tanto de los niños y adolescentes como de los padres o encargados de éstos en todas las áreas de tratamiento.

Otro objetivo importante del Tratamiento Diurno es su conexión con la comunidad, sirviendo entre otras situaciones como: (1) el enlace entre los niños y los adolescentes en transición de un lugar residencial a los centros de Servicios Ambulatorios; (2) manteniendo,los lazos con su familia y la comunidad evitando el patrón regresivo que se observa frecuentemente en los pacientes hospitalizados; (3) desarrollando servicios de consultoría y enlace con agencias de la comunidad.

Por último, pero no menos importante, está el concepto del Programa de Tratamiento Diurno como excelente fuente

de educación y entrenamiento a residentes de psiquiatría, estudiantes de trabajo social, psicólogos, enfermeras, etc. como a otros profesionales en el campo de la Salud Mental. Hay quienes consideran las experiencias clínicas de un Programa Diurno como un recurso de investigación único para la revisión e identificación de mejores técnicas de tratamiento, criterios de admisión a programas, etc.

Indicaciones para tratamiento diurno:

La decisión para utilizar este tipo de tratamiento en niños y adolescentes en muchos lugares se hace tomando en consideración entre otros factores: la severidad y/o complejidad de la sintomatología del paciente, los recursos disponibles para facilitar el plan de tratamiento o para alcanzar un mejor funcionamiento del paciente y el fracaso de los diferentes intentos terapéuticos por mejorar el funcionamiento del paciente.

Los niños que se refieren y son aceptados a esta facilidad son similares en muchas características a los admitidos para tratamiento residencial en cuanto a la severidad del disturbio psicológico. Son niños que no pueden funcionar en programas escolares de la comunidad y requieren un manejo consistente e interdisciplinario y tienen dificultades académicas y/o conductuales. Dentro de la patología a nivel emocional podemos encontrar niños con psicosis, trastornos del desarrollo, síndromes orgánicos, desórdenes del carácter y condiciones neuróticas severas y moderadas.

Se aconseja que la aceptación del paciente deba ser precedida de una evaluación diagnóstica intensiva que puede conllevar de 2 - 4 semanas. Una vez completado ese proceso evaluativo se decidirá si el paciente será admitido o no, a base de si la facilidad pudiera o no ayudarle.

Entre las razones que más frecuentemente se dan para utilizar esta modalidad de tratamiento se encuentran los siguientes:

1. El paciente presenta alto riesgo para si mismo o para los demás.
2. El paciente que continuamente causa "disturbios" en la comunidad y el cual no ha mejorado su condición a través de servicios terapéuticos. En este caso se visualiza que por su persistente conducta negativa en la comunidad no se puede beneficiar de una relación positiva con figuras adultas.
3. El paciente cuyo comportamiento sexual o agresivo pueda requerir una ubicación que le permita evitar caer en problemas como consecuencia de esta conducta dentro de un ambiente que no le regule "su libertad".Dentro de este grupo se ha trabajado más con adolescentes que protestan por su reingreso a centros residenciales, el adolescentes que presenta conducta delictiva; adolescentes cuyos padres están muy ansiosos por delegar su responsabilidad y los "depositan" en el sistema de Salud Mental, el adolescente que externaliza negativamente sus deseos de independencia, etc.
4. El paciente psicótico de 12-15 años en estado severo de regresividad donde otras alternativas han fracasado.
5. El paciente con desórdenes psicosomáticos severos.
6. Casos especiales que requieren de una observación más estrecha.

Por otro lado Herz et al[13] habla de lo que considera pacientes para los cuales este tipo de tratamiento está contraindicado:

1. pacientes que presentan peligro para otros y ellos mismos.
2. aquellos pacientes que pueden ser atendidos en un ambiente clínico menos restrictivo, como en el Servicio Ambulatorio.
3. aquellos pacientes cuyos padres y/o encargados están severamente afectados, peligrosos y abusivos y
4. aquellos pacientes que por enfermedades o limitaciones físicas requieren cuidado constante.

Así mismo Evangelakis[10], nos habla de algunos puntos a considerar para no recomendar este tipo de tratamiento, los que llamaremos en esta discusión los "NO'S vs. Centro de Tratamiento Diurno":

1. Ambiente familiar patológico:
   Nunca se debe utilizar como una justificación para este tipo de tratamiento; ya que podría resultar más traumático.
2. Dificultad en ofrecer los servicios clínicos que necesita el paciente a través del servicio ambulatorio debido a un problema en la organización de los servicios.
3. Respuesta pobre al tratamiento en un periodo de tiempo. (Hay que tener cuidado en que esta decisión no esté basada en consideraciones del calendario en lugar de las necesidades del paciente).
4. Padres poco cooperadores o no tratables:
   La mayor parte de estos programas insisten en la participación activa de los padres en el plan de tratamiento; para evitar que el niño cree dependencias con las agencias y para facilitar su pronta integración a la familia. Hay que recordar que los padres que no son cooperadores son el servicio clínico en otras facilidades probablemente tampoco cooperen con las demandas del Centro de Tratamiento Diurno y pudieran utilizarse las agencias o programas como un lugar donde "depositar" a los niños.
5. Diagnóstico inadecuado requiriendo más observación para establecer un mejor diagnóstico. Esto no debe ser una razón exclusiva para justificar por sí solo esta alternativa de tratamiento en el Centro de Tratamiento Diurno.
6. Ordenes de Corte:
   Esta situación puede llegar a comprometer injustamente la disposición final del paciente en espera de una orden judicial.

Por otro lado las recomendaciones generales para considerar el Tratamiento Diurno deberán considerar entre otras las siguientes preguntas según Evangelaskis:[10]

I. Severidad del Desorden Emocional:
   -¿Cuán enfermo está el paciente?, ¿Cuánto riesgo presenta?, ¿Cómo ha respondido a otras modalidades en el pasado?, ¿El comportamiento del paciente, requiere las demandas limitadas de respuesta interpersonal impuesta por el "setting clínico" que tiene el Centro de Tratamiento Diurno?, ¿Necesita el paciente de un ambiente estructurado, con límites, controles, etc?.
II. Severidad del trastorno del paciente en términos de su familia:
   Es importante el potencial de los padres para envolverse en el programa de tratamiento en un Centro de Tratamiento Diurno. Teniendo ésto

presente deberíamos preguntar entre otras cosas lo siguiente: ¿Puede el niño mantenerse en su hogar? ¿Pueden los padres apoyar y mantener el programa de tratamiento permaneciendo el paciente en el hogar? ¿Cuán afectados están los padres? ¿Los padres apoyarían o no el tratamiento?

III. Severidad del Desorden del paciente en términos de la Escuela:
Frecuentemente un niño con severas dificultades en su aprendizaje en adición a aislamiento, separación o comportamiento problemático, requiere tratamiento diurno.

IV. Severidad del desorden del paciente en términos de la Comunidad:
¿Hasta qué punto la conducta y/o acciones del paciente han impactado la comunidad? ¿Hasta qué punto es el comportamiento del niño destructivo y peligroso fuera de la familia ¿Cual ha sido la respuesta o el grado de triunfo de la ayuda brindada por personas o agencias de la comunidad?

El Ambiente Terapeútico del Centro de Tratamiento Diurno:

Debe ser un ambiente que promueva una atmósfera de aceptación, con un grupo de profesionales que serán responsables de las necesidades de los niños que asistan y sus familias.

La relación con los padres es muy importante para crear una alianza necesaria que facilite la asistencia regular del niño y/o de sus padres. Esto facilitará la modificación necesaria de las relaciones familiares. Herson[14] ha encontrado muy útil los grupos de padres para discutir los problemas que tienen los hijos emocionalmente afectados. A través de la hospitalización parcial el niño con Disturbio Emocional Severo se puede beneficiar al asistir a un ambiente terapéutico cuidadosamente planificado pero a la misma vez estar con su familia parte del tiempo. El objetivo del tratamiento en un Centro Diurno de mantener al paciente en su unidad familiar pero compartiendo el cuidado físico y la atención del paciente con sus padres o encargados; a la vez que provee una cantidad de tiempo durante el día fuera del ambiente familiar[14]. Esto tiene la ventaja de no promover la separación de la familia y del paciente.

El tiempo que tanto el paciente como su familia asiste al programa dependerá del propósito de su asistencia. Puede haber familias muy desorganizadas que requieran asistencia intensa de varios días por semanas[15]. Habrán otros casos menos severos que pueden requerir 1 ó 2 días terapéuticos/semana.Para aquellos casos de edad escolar con síndrome severo de rehusarse ir a la escuela, se recomienda una asistencia como lo exigiría la escuela de estar asistiendo a ésta[14].

Efectividad de esta Modalidad de Tratamiento:

Los resultados de una modalidad de tratamiento en términos psiquiátricos y/o psicológicos nos son fáciles de medir pero se hace necesario seguir tratando de realizar estudios al respecto. Además del alto costo que conlleva la investigación de este tipo de centro de tratamiento está el hecho de la gran variedad de enfoques que pueden tener los centros de Tratamiento Diurno.

Sin embargo,se han reportado algunos estudios que han considerado el medir la efectividad y/o costo de algunos centros. En términos de costo Kiser et al[16] estudió las diferencias en cuanto a costo relativo en el tratamiento a niños y adolescentes en un centro de Tratamiento Diurno versus tres ambientes terapéuticos hospitalarios. En este estudio concluyó que el tratamiento diurno es igual o menos costoso que la hospitalización, pero se recomienda la importancia de continuar la investigación en este aspecto.

Entre los aspectos clínicos que se han tratado de relacionar con la eficiencia de este tipo de programa se han incluido las siguientes;

1. Edad a la cual comienza el tratamiento.
2. El grado de participación y cooperación de los padres.
3. Duración del tratamiento.

Gold & Reisman[17] y Robertson & Freidberg[18] realizaron estudios sobre la efectividad de esta modalidad de tratamiento, encontrando mayor grado de mejoría para los pacientes más jóvenes pero también la necesidad de seguir obteniendo beneficios de facilidades de Educación Especial o de continuar tratamiento en los niños que requirieron servicios de hospitalización diurna.

Swan & Wood[19] reportaron ajustes satisfactorios en el 76-90% de los niños en tratamiento diurno en centros con una orientación de terapia educativa y del desarrollo. Por otro lado, Blom et al[20], Goldfarb et al[21], La Vietes et al[22] y Zimet et al (1980)[23] reportaron también un ajuste satisfactorio en la comunidad en pacientes que habían recibido tratamiento en Centros con un enfoque psicodinámico. Así mismo, Prentice-Dum et al[24] reportaron ajustes satisfactorios en niños que asistieron a un programa de Tratamiento Diurno con un enfoque conductivista. Ellos encontraron que la edad del paciente, la inteligencia y la estructura familiar contribuían significativamente a los cambios del comportamiento de los pacientes. Este grupo encontró que los niños que demostraron los cambios de conducta más positivos eran los pacientes de menor edad al comenzar el tratamiento. Además encontraron que los niños con menor inteligencia tuvieron cambios más significativos en su conducta que los de inteligencia mayor.

Por otro lado se llevaron a cabo dos estutíos en cuanto a la efectividad de centros te Tratamiento Diurno para adolescentes. Kenttlewell et al[25] encontraron ganancias en cuanto a relaciones con pares, problemas académicos/escolares y el control de las emociones. Así mismo Corky & Zimet[26] le dieron seguimiento a 51 pacientes hasta su adultez temprana encontrando en general relaciones positivas entre los que habían sido pacientes, con sus padres y amistades.

Gabel et al[27], nos habla también de la efectividad del tratamiento Diurno con niños severamente afectados. Su estudio está basado en la revisión de expedientes de 52 casos atendidos y dados de alta del Programa de Hospitalización Diurna para niños del Hospital de New York-Centro Médico de Cornell, donde se sigue un enfoque psicodinámico (con énfasis en psicoterapia a nivel individual y grupal). Los niños entre las edades de 4-12 años fueron referidos por problemas de conducta como impulsividad, hiperactividad, etc. Era común a ésta población el proceder de una familia donde había historial de abuso, desorganización, violencia y abuso de sustancias. La efectividad del programa se trató de correlacionar a la idea de la ubicación del paciente en su hogar al finalizar su estadía en el Programa luego de años de intervención; ya que éste es

uno de los principios básicos de esta modalidad de intervención. Los resultados de su estudio demuestran que los pacientes que completaron su tratamiento en el Programa y regresaron a su hogar pertenecían a grupos minoritarios de familias multiproblemáticas; pero donde no había historial de abuso de sustancias en sus padres, ni historial de haber sido severamente abusados/maltratados. Eran pacientes que no tenían ideas/comportamiento destructivo/asaltante severo.

El que el paciente al darse de alta no pudiera regresar al hogar sino que fuera ubicado en un Hospital o Centro Residencial estaba asociado a la presencia de las siguientes variables antes de la admisión al Programa: abuso/maltrato, padres con historial de abuso de sustancias, ideas/comportamiento suicida y comportamiento altamente destructivo/asaltante. Tomando estos hallazgos en consideración, Gabel[26] recomienda que esta modalidad de intervención puede ser efectiva para cierto grupo de niños del área urbana que provienen de hogares desorganizados y caóticos y que presentan problemas de conducta, desórdenes de atención e impulsividad ya que a éstos generalmente se les recomienda ubicación en el hogar una vez completado el tratamiento.

En resumen de estos estudios se desprende que en 3 diferentes centros con orientación psicodinámica, niños con disturbio bastante severo pudieron tener buen ajuste social. En un centro psicodinámico y de orientación conductual, los niños que comenzaron el tratamiento a menor edad demostraron tener cambios más positivos en su comportamiento que aquellos que comenzaron el tratamiento a mayor edad.

Por otro lado hay algunas áreas aún no claras que se han señalado como que ameritan mayor investigación. Como por ejemplo:

1. Ejecución de los pacientes en pruebas que puedan medir: aprovechamiento académico, habilidades intelectuales (en Escala Verbal vs. Ejecución) utilizando WISC o WICS-R.
   Ejemplo: El estudio del grupo de La Viete (1965) no encontró diferencias en destrezas intelectuales, medidas antes y después del tratamiento utilizando la prueba psicológica WISC pero el grupo de Zimet et al[2] sí encontró utilizando la prueba psicológica WISC-R.
2. La posible relación entre una mejor autoestima según reportan estos pacientes versus una relación más saludable de parte de los padres y/o maestros hacia el paciente[2]. O sea; cuánto de ésto es resultado directo del tratamiento hacia el paciente vs. resultado de la opinión que tienen las personas allegadas al paciente ante el cambio positivo de su conducta.
3. ¿Qué relación existe entre el potencial intelectual del paciente y el enfoque o énfasis terapéutico del programa?
4. El rol de la estabilidad que proveen los encargados del menor; ¿cómo impacta con quién reside el paciente en la efectividad del programa o tratamiento?
5. ¿Cómo es más efectivo el tratamiento con un grupo de pacientes homogéneos o heterogéneo (edad,etc.)?

Aunque los estudios señalados conllevan diferencias en sus resultados finales que pudieran atribuirse a las diferentes orientaciones que tienen diferentes centros; ésto en lugar de ser un factor limitante para la investigación en ésta área clínica es visto por muchos profesionales e investigadores clínicos como un incentivo más. Con la experiencia obtenida hasta ahora es importante poder ir definiendo y aclarando la ubicación de estos programas; qué tipo de paciente se puede beneficiar más y de qué programa en particular. Estas y otras inquietudes nos deberán de guiar hacia una investigación más formal y fructífera.

Conclusiones

El Centro de Tratamiento Diurno ofrece una alternativa de tratamiento donde se mantiene al paciente dentro de su núcleo familiar y como miembro de su comunidad. Por otro lado, hay que ubicar estos Centros en áreas de accesibilidad a las familias para evitar incurrir en limitaciones al tratamiento por dificultades de transportación, etc.

Es importante seguir realizando estudios donde se pueda comparar la efectividad de esta modalidad de tratamiento versus otras modalidades. En Puerto Rico se hace ésto más significativo si se toma en consideración que nuestras familias en muchos casos no aceptan la modalidad de la hospitalización por considerarla como una manera de excluir al paciente de su familia y/o por la estigmatización que ésta conlleva para el paciente.

Aunque puede resultar algo costosa, esta modalidad de tratamiento se justifica en la medida que intervengamos con estos menores; los cuales si al presente como dice Willock[29] pueden presentar entre otras dificultades la conducta de "tirar libros o pupitres a la maestra"; de no intervenir apropiadamente con ellos y asegurar su progreso a largo plazo; podrían eventualmente convertirse en "adultos que en lugar de tirar libros utilizan armas más letales, con resultados más trágicos" y a la larga los costos/beneficios para nuestra sociedad serán mayores...

En cuanto a la duración del tratamiento se dice que cerca de 80 programas a través de los Estados Unidos tienen una estadía promedio de pacientes (niños y adolescentes) de 15.8 meses. El promedio reportado fue entre 2-42 meses[12]. Por otro lado, se indica que la duración de la estadía se afecta significativamente con el funcionamiento y la estructura de la familia, como también del compromiso y cooperación de la familia con el plan de tratamiento.

En los Estados Unidos aproximadamente 40% de los fondos para estos centros provienen del Estado y cerca del 16% de Medicaid[11]. Así mismo, hay 26 estados que han emitido leyes que hacen mandatorio el incluir beneficios de Servicios de Salud Mental en sus pólizas de seguro médico privado. De esos; 7 estados: Colorado, Connecticut, Maine, New Hampshire, North Dakota, Oregón y Vermont, incluyen los beneficios de Hospitalización Parcial.

Esta es un área que requerirá mayor exploración en Puerto Rico.

Summary: **A description of the origen, philosofies and objetives of the Day Treatment Programs is presented. Although this treatment modality was iniciated with the adult population, it's applications as a treatment modality for children and adolescents is also presented with a description of it's development in Puerto Rico. A review of the literature about its benefits/advantages, contra-indications and efficacy is also included. Recomendations about its future in the planification of mental health services for children and adolescents in Puerto Rico are presented.**

Key Words: Day Treatment, Child/Adolescent, Impact

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Chapter of Alzheimer Disease Advisory Board Organized in Puerto Rico

The Puerto Rico chapter of the Alzheimer Disease Advisory Board (PRADAB) was recently organized in Puerto Rico.

The new organization, composed of medical specialists which include psychiatrics, neurologists, geriatrists and family doctors, is compose of the following physicians:

Juan A. Rosado Matos, internist/ geriatrist; Judith Román, neurologist; José A. Franceschini Carlo, geriatric psychiatrist; Carlos García Goyco, family doctor/geriatrist Marian De Jesús, family doctor; Richard De Andino, family doctor/geriatrist; Paquita Moya Huff, family doctor/geriatrist, and Carlos Cabán, psychiatrist.

The purpose of the organization is to expand physicians' and other health professionals' knowledge on the diagnosis and management of patients of Alzheimer's. The panel will also undertake to raise public awareness about characteristics that help make an early diagnosis and about existing alternatives to improve the quality of life of Alzheimer's patients and their families.

PRADAB also plans to provide guidance to physicians and other health professionals about managing the condition in an integrated way, that is, providing the support and appropriate follow up that these patients require, as well as assisting their care givers.

Alzheimer's disease affects close to four million personas in the United States, 50 percent of whom are elderly patients over age 85. In Puerto Rico it is estimated that approximately 25,000 persons are afflicted with Alzheimer's.

Alzheimer's is a progressive and debilitatinf neurological disorder which is currently the fourth cause of death in the United States and Puerto Rico, surpassed only by heart attacks, brain strokes and cancer. Although it is more common among the elderly, it can also affect persons in their 40's and 50's, with a patient of age 28 being the youngest diagnosed with Alzheimer's.

Organizan en Puerto Rico Capítulo de Alzheimer Disease Advisory Board

Recientemente quedó oficialmente instituido el capítulo de Puerto Rico del Alzheimer Disease Advisory Board (PRADAB). Dicho capítulo está compuesto por un grupo de especialistas médicos entre los que se encuentran psiquiatras, neurólogos, geriatras y médicos de familia.

Los especialistas que componen PRADAB son los doctores Juan A. Rosado Matos, internista/geriatra; Judith Román, neuróloga; José A. Franceschini Carlo, psiquiatra geriátrico; Carlos García Goyco, médico de familia/geriatra; Marian De Jesús, médico de familia; Richard De Andino, médico de familia/geriatra; Paquita Moya Huff, médico de familia/geriatra; y Carlos Cabán, psiquiatra.

El propósito de la organización es ampliar el conocimiento de la clase médica y de otros profesionales de la salud sobre el diagnóstico y manejo de pacientes afectados con la condición de Alzheimer. Parte de la misión de este panel será, además, concientizar al público en general de las características que hacen posible la identificación temprana y las alternativas para mejorar la calidad de vida de estos pacientes y de sus familiares.

PRADAB proyecta, además, orientar a los médicos y otros profesionales de la salud sobre cómo manejar la condición de manera integrada, es decir, ofreciendo el apoyo y seguimiento adecuado que estos pacientes requieren, así como también brindando ayuda a las personas que los atienden.

El mal de Alzheimer afecta a cerca de cuatro millones de personas en Estados unidos, el 50 por ciento de los cuales son envejecientes sobre 85 años de edad. En Puerto Rico se calcula que alrededor de 25,000 personas sufren de la condición de Alzheimer.

La enfermedad es un desorden neurológico progresivo y debilitante que constituye la cuarta causa de muerte en Estados Unidos y en Puerto Rico, superado tan sólo por las muertes por eventos cardiovasculares, cerebrovasculares y el cáncer. Aunque tiende a manifestarse con mayor frecuencia en personas de edad avanzada, también afecta a personas entre los 40 y 50 años de edad, siendo de 28 años el paciente más joven que se ha diagnosticado con el mal de Alzheimer hasta el presente.

Escuela de Medicina San Juan Bautista Reacciona Al Editorial del Dr. Luis Ramírez Ferrer

Por: Juan A. Chaves Abreu
Presidente

En la edición de junio y julio de 1992 del Boletín de la Asociación Médica de Puerto Rico el Dr. Luis O. Ramírez Ferrer escribe el Editorial "Escuela de Medicina para Mayagüez: ¡Ahora o Nunca!" en el cual hace referencia a la Escuela de Medicina San Juan Bautista llegando a conclusiones y expresando conceptos equivocados los que fácilmente pudo haber constatado mediante simple comunicación telefónica con esta Escuela antes de publicar su escrito.

Expresa en su escrito el Dr. Ramírez, entre otras cosas, que la Escuela "carece de unas ciencias clínicas adecuadas que le permitan conseguir la acreditación por el LCME". La Escuela tiene unos talleres clínicos extraordinarios con una excelente facultad en los hospitales Dr. Alejandro Buitrago de Guayama y Dr. José N. Gándara de Ponce. En el Hospital Interamericano de Medicina Avanzada (HIMA) en Caguas, donde ubica el Recinto de Ciencias Básicas por recomendación del propio LCME, con una inversión millonaria, los estudiantes hacen sus rotaciones de subespecialidades y electivas. Este hospital, el más moderno de Puerto Rico, de nivel supraterciario con salas de intensivo neonatal (NICU) y pediátrico (PICU) ofrece unas experiencias a los estudiantes en hospital privado que no están disponibles en el Centro Médico de Mayagüez.

Desconoce el distinguido galeno que en los años 1991 y 1992 fueron los Dres. Gloria Goya, José Forina y Osvaldo Quiles graduados de San Juan Bautista quienes obtuvieron la mejor nota en la reválida ofrecida por el Tribunal Examinador de Médicos de Puerto Rico. El producto de unas ciencias clínicas inadecuadas no hubiera alcanzado este logro.

Desde el año 1992 la Escuela de Medicina San Juan Bautista comparte con éxito el Consorcio del Hospital Dr. José N. Gándara de Ponce con los estudiantes del Recinto de Ciencias Médicas de la Universidad de Puerto Rico. La experiencia ha sido extraordinaria y la facultad del Hospital se ha expresado satisfecha con la capacidad y competencia de los estudiantes de la Escuela de Medicina San Juan Bautista "que comparan por igual con los del Recinto de Ciencias Médicas". En este Hospital, al igual que en el Centro Médico de Mayagüez, también hay programas de residencias acreditados.

Es poco responsable de parte del Dr. Ramírez Ferrer concluir en su escrito que a menos que la Escuela de Medicina San Juan Bautista traslade sus talleres clínicos al Centro Médico de Mayagüez "jamás logrará su acreditación por el LCME".

Recientemente recibimos la visita de los doctores Jonas y Kassembaum, Secretarios del LCME, para iniciar el proceso de preparar el autoestudio para solicitar la visita de acreditación. Ambos recomendaron se gestionara con el Gobierno que nuestros estudiantes tuvieran acceso al Hospital Regional de Caguas, próximo al Recinto de Ciencias Básicas, para facilitar la integración necesaria entre las facultades básicas y clínicas. El Centro Médico de Mayagüez por la distancia imposibilita este proceso, requisito indispensable para la acreditación del LCME.

Siguiendo el consejo y asesoramiento de los oficiales del "Liaison Committee on Medical Education" (LCME), próximamente iniciaremos el proceso de auto-estudio para solicitar la visita de acreditación. Nuestros programas educativos cumplen con los requisitos.

El progreso alcanzado por la Escuela de Medicina San Juan Bautista ha sido reconocido por el LCME, lo que nos produce confianza en lograr su acreditación.

La Escuela de Medicina San Juan Bautista ha servido y sirve bien al Pueblo de Puerto Rico. La mayoría de sus 444 graduados sirven de médicos primarios, la medicina del futuro, en los CDT del gobierno, atendiendo a la clase más necesitada, los médico-indigentes.



Agradecimiento a Colaboradores

La Junta Editora del Boletín de la Asociación Médica de Puerto Rico reconoce la cooperación y apoyo brindado por una serie de personas para lograr la misión editorial recomendada.

Pocos de nuestros lectores y autores conocen la enorme contribución que hacen los árbitros al proceso de publicación de artículos en el Boletín. Estas personas desinteresadamente brindan su esfuerzo y su tiempo al análisis y corrección de los manuscritos sometidos para evaluación por esta Junta. También brindan valiosos servicios al Boletín con comentarios editoriales, artículos de repaso, material gráfico y otras tareas solicitadas por la Junta Editora para lograr confeccionar una publicación científica de calidad. Aprovechamos esta ocasión para expresar públicamente a estas personas nuestro agradecimiento por su valiosa labor durante todo este año.

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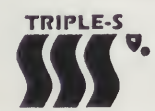
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PRIMERA JORNADA SOBRE SIDA

Asociación Médica de Puerto Rico

PREVENIR ES VIVIR

26 de marzo de 1994
Hotel San Juan
Isla Verde, Puerto Rico

PROGRAMA

7:30 am - 8:30 am	Registro
8:30 am - 9:30 am	Epidemiología del SIDA y Proyecciones Estadísticas de la Enfermedad.
9:30 am - 10:30 am	Actualización de Conceptos sobre el SIDA: Etiología, Mecanismos de transmisión, diagnóstico, medios de prevención.
10:30 am - 11:30 am	Actualización de los aspectos Bio-Psico-Sociales del Paciente VIH+/SIDA.
11:30 am - 1:00 pm	**Almuerzo**
1:00 pm - 2:00 pm	Panel de Discusión: "Mecanismos tradicionales y no tradicionales de educación y prevención contra el SIDA" por iniciativas comunitarias.
2:00 pm - 3:00 pm	Enfoques del Sistema Educativo de Puerto Rico hacia la prevención del SIDA con las escuelas, la familia y la comunidad.
3:00 pm - 4:00 pm	Impacto Económico de la Epidemia del SIDA en Puerto Rico y los Estados Unidos.
4:00 pm - 5:00 pm	Implicaciones médico-legales en el discrimen a pacientes VIH+SIDA.

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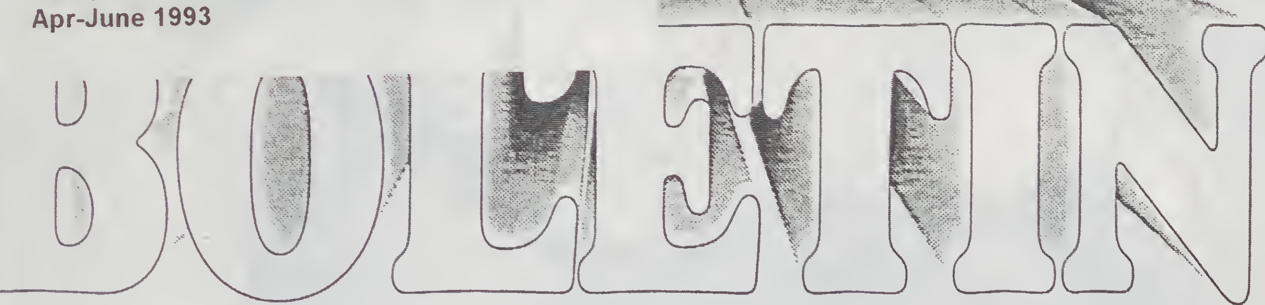
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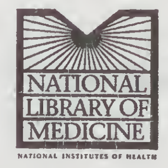


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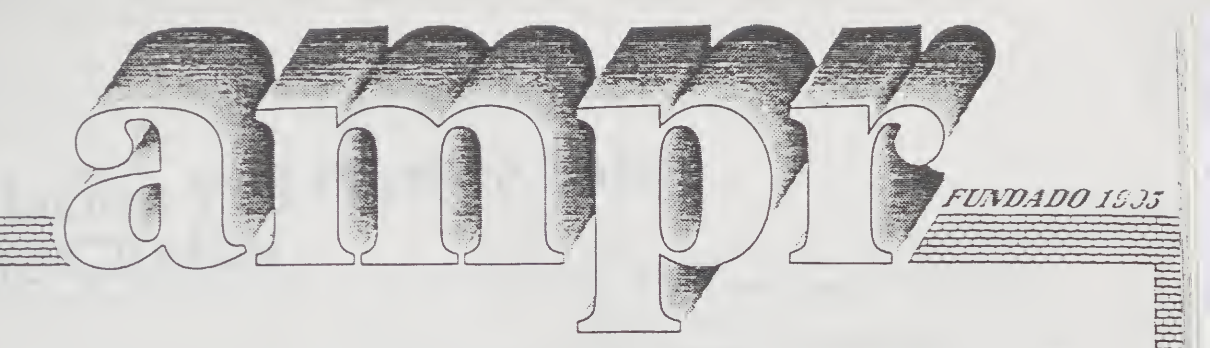
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La Sobrepoblación y el Plan de Salud del Presidente Clinton

Por: Miguel Colón Morales, M.D.

os planes de salud diseñados por políticos y economistas para controlar los costos médico-ospitalarios y los presupuestos, limitan los esfuerzos e los médicos y otros trabajadores de la salud para educir la tasa de mortalidad controlando las nfermedades mediante un mejor cuidado de la salud. l reducirle la capacidad económica para la nvestigación médica y un cuidado médico ospitalario de mejor y verdadera calidad, se hace ás difícil lograr ese objetivo.

A largo plazo se limitaría más y gradualmente la alidad de los servicios médicos ofrecidos. Desde uego habrá más acceso, más control y menos calidad n los servicios recibidos. Esto hará posible que en orma casi "natural" no sobrevivan los más débiles en u resistencia a los microbios y otras causas de nfermedades y de muerte.

Es una forma poco humanizada de controlar la obrepoblación pero al mismo tiempo más realista y uizás aceptable para muchos que no les "duele el allo" y que creen no serán afectados en el presente o n el futuro.

Entre el SIDA y otras plagas como tuberculosis esistente a los medicamentos y el Plan Clinton de alud, gradualmente se logrará controlar la explosión e población que tanto está afectando al ambiente en uestro Planeta Tierra y especialmente en países como l nuestro con sus limitaciones geográficas y una obrepoblación que no ha podido ser controlada por azones políticas y religiosas.

Lo que no han podido lograr los movimientos mbientalistas al reconocerse el grave problema de la obrepoblación y su efecto dañino en el ambiente, las plagas y los políticos del presente van a ayudar a acilitar el control de esa sobrepoblación. Las plagas que afectan al ser humano periódicamente es un mecanismo de la naturaleza para seleccionar el más apto, saludable o cuidadoso que usualmente es el que las sobrevive.

El tiempo dirá qué pasará ya que los efectos de estas medidas son difíciles de demostrarse a corto plazo. Lo que en el presente puedan parecer buenas medidas para controlar costos o crear conciencia de costos versus exceso de calidad en los servicios médico hospitalarios, pueden con el tiempo demostrar ser poco efectivas en sus propósitos. La medicina puede resultar peor que la enfermedad.

Finalmente resultará en un experimento diseñado por los políticos y los gobernantes para controlar el presupuesto nacional y local a sacrificio de la salud de todo un pueblo con la excusa de un "mejor acceso" a los servicios médicos aunque éstos sean de inferior calidad.

Para muchos lectores lo arriba expuesto parecerá poco realista y hasta jocoso. Puede parecer algo atrevida esta línea de pensamiento y pretender este pronóstico ambientalista sin evidencia científica para sostenerlo. Más bien parece ser una opinión exagerada de un ambientalista demasiado preocupado o de un médico disgustado o preocupado por los cambios que se anticipan puedan ocurrir en la práctica de la medicina y como su calidad puede ser afectada. Sin embargo, les aseguro a todos que el propósito principal es que sirva de voz de alerta para que no seamos sorprendidos y luego nos veamos todos afectados, los médicos y la comunidad en general, en lo que considero debemos todos más apreciar, i. e., nuestra salud.

Qué pasará finalmente es difícil de pronosticar. El tiempo dirá y una vez más: ¡QUE DIOS NOS AYUDE!

Director, Departamento de Anestesiología, Hospital del Maestro, Hato Rey, Puerto Rico.

El Problema del Aborto

Por: Juan Figueroa Longo, M.D., José C. Román De Jesús, M.
Antonio Ramos Barroso, M

La discusión sobre el dilema del aborto cobra vigencia hoy apenas en los albores de un nuevo milenio, tal como lo ha sido en el pasado a través de todas las épocas. Así, el Juramento de Hipócrates ya plantea al médico el aspecto deontológico del aborto: "y de ninguna manera le daré a mujer alguna un pesario para producir aborto". No obstante varios filósofos contemporáneos de Hipócrates aceptan el aborto: Platón, en "la República" y Aristóteles en, "Política" lo condicionan a que se haga antes del feto ser viable. Pero la Escuela de Pitágoras sostiene la objeción al mismo como dogma, ya que expresan el convencimiento que el embrión recibe el alma en el momento de la concepción. Y es este punto el que promueve el debate más amplio. ¿Cuándo comienza la vida? Dice Coughlan que "diferentes culturas tienen diferentes puntos de vista sobre la vida después de la muerte; es claro que tengan también diferencias en cuanto a la vida antes del nacimiento". En Japón, donde la definición de muerte al cese de toda función cerebral, no es aceptable, sin embargo, el aborto por petición es la norma. Varias religiones en Inglaterra tienen diversas interpretaciones. Las tres denominaciones religiosas monoteístas más importantes: Cristiana, Judáica e Islámica, no son unánimes en sus enseñanzas y menos dentro de ellas mismas. Si es así en el aspecto religioso, en el científico existe el mismo diferendo.

Para 1960 el Colegio Americano de Obstetras y Ginecólogos determinó que el "embarazo comienza con la implantación". Aunque esta declaración ha sido utilizada para las leyes sobre el aborto de Austria, Australia, Nueva Zelandia y Holanda; Keller y Zlatnick dicen que: "la implicación de esta declaración no ha sido reconocida: el comienzo del embarazo no coincide con el comienzo de la vida humana".

En la opinión del Tribunal Supremo de los Estados Unidos, en el caso Roe vs. Wade cita a la teología cristiana que localiza la animación del feto en 40 días para el varón; 80 días para el sexo femenino. Este concepto siguió hasta el Siglo XIX. Luego se determinó la expresión de animación a los movimientos y se consideró así al primer movimiento que percibía la madre. Bracton, estableció en el Siglo 13 que abortar un feto que hubiera sido percibido en su primer movimiento por la madre era homicidio.

Desde el punto de vista ético que estableció la política que regía estos principios desde la antigüedad: la beneficiencia, o sea donde se hace todo por beneficiar a un paciente sin tomar en cuenta sus deseos, se ha pasado al concepto autonómico; como predominan donde se respeta el concepto del libre albedrío pa decidir, aceptar y/o rechazar, descontinuar u tratamiento. Chervenak y McCullough, partiendo d estos conceptos alegan que el feto no tiene un desarroll cerebral (central) por lo tanto no tiene creencias n valores por lo que no se puede decir que el feto teng una perspectiva sobre sus intereses, por lo que n puede aplicarse el principio autonómico en el fet porque el feto no es paciente. Surge entonces el deba cuando el feto es paciente. La primer interrogante contestar sería si el feto tiene un status mora independiente. Unos dicen que lo tiene desde momento mismo de la concepción o implantació Otros dicen que ese status moral se adquiere e gradaciones, estableciéndose por lo tanto un stat moral por grados. Finalmente, varios difieren y señal que el feto no tiene una moral independiente has que no sale del útero. Por lo tanto no hay consens Surge entonces la polémica de que si se aplica concepto de beneficiencia en el niño en el que va convertirse el feto; esto es cuando tiene viabilida Para esto tampoco hay consenso. En todo el mundo determinará la viabilidad de una manera dif ent Chervenak y McCullough establecen la viabilida aproximadamente a las 24 semanas de eda gestacional: otros a las 12 semanas. Se plantea adem que el enlace entre el feto y el niño que va a ser, es autonomía de la mujer embarazada, introduciéndo otro factor ético en el sentido del feto como pacien Entonces, se aduce, que el enlace, entre el feto y el ni que va a ser si no es viable fuera de la dependencia d la madre, lo establece ella con sus criterios, creenci y determinaciones, presentando al feto entonces médico solo en la función de la autonomía de madre embarazada. Si la madre no está dispuesta asumir esta posición, entonces se considera a fe como un paciente provisional. La obligación mor surge de educar a la madre en buena nutrició abstención de fumar y de ingerir bebidas alcohólica de usar substancias nocivas al feto porque lo tenem a él como una responsabilidad como paciente y de cuidarse. De todo esto nos surge "el derecho a l vida". Aunque se trata ampliamente en otro escri este concepto se define dentro de los siguient criterios: el derecho a no resultar muerto (algunos añaden injustificadamente), el derecho a que no descontinúe el mantenimiento de la vida injustamen y el derecho que ese mantenimiento se prolong durante el tiempo que sea necesario. Si se aplica

echo a la vida como argumento a la posición abortista no puede excluirse la excepción que se ce: la violación y el incesto, porque el feto tiene ese echo independiente de cómo se concibió.

Después de estas desquisiciones éticas y filosóficas mos cuál es la legislación en Puerto Rico. Es obvio que en nuestro país impera la decisión del Tribunal premo de los Estados Unidos en el caso Roe vs. de, además de la legislación vigente en el Estado re Asociado de Puerto Rico.

En este famoso caso (Roe vs. Wade) una mujer era (Roe) llevó un pleito de clase que cuestiona la stitucionalidad de la ley del Estado de Texas, que hibe el aborto y lo hace un delito criminal con sólo excepción: "por recomendación médica con el pósito de salvar la vida de la madre".

La Corte de Distrito decretó que la ley de Texas era nstitucional por que violaba la 9na y 14a enmienda la Constitución Norteamericana. Se apeló al Tribal Supremo de los Estados Unidos de Norteamérica ste confirmó la desición del Tribunal inferior ándose en que invadia el derecho de la mujer barazada, de seleccionar, terminar o no su embarazo ertad personal incluida en 14a Enmienda de la stitución) y la privacidad sexual contenida en la ta de Derechos así como la de la 9a Enmienda.

n esta decisión se hace una revisión histórica sobre ma que no vamos a repetir. Sin embargo es bueno en la discusión del caso, que cuando estas leyes probaron el Estado asumía el papel de protector vida de la mujer, ya que el aborto era un riesgo a da misma de esa mujer. Se señala "que las técnicas ernas han alterado la situación", además que la talidad por abortar en aquellos países permitidos ley es menor que las muertes secundarias a un o normal. Se determina así, que la función del do protector termina. Se analiza además el interés el estado pueda tener en la protección de la vida eto.

discuten los puntos a favor y en contra, no ante, aparenta prevalecer que el espíritu de la lación fue proteger la vida de la madre ya que e la discusión ética, filosófica, legal y religiosa de ndo comienza la vida?, sin que se encuentre un senso.

concluye, sin embargo que este derecho de la er no es "in calificado" y que existen intereses ortantes que permiten al estado ciertas regulaes: la protección de la salud, los estándares médicos vida prenatal.

alegaba del derecho de la "persona" ¿qué es ona? La propia Constitución habla de "persona" o del nacimiento. Así finalmente se concluye en decisión que:

Cualquier ley estatal que limite sólo el aborto a uando la vida de la madre esté en peligro es constitucional porque viola la 14a enmienda.

a. Durante el primer trimestre el embarazo se deja a la discreción médica del profesional seleccionado por la embarazada.
b. A partir del primer trimestre el Estado puede regular el aborto, pero siempre tomando en consideración la salud de la madre.
c. Al estadío subsiguiente a la viabilidad fetal, el Estado puede regular y/o prohibir el aborto, con la excepción, de cuando es necesario preservar la salud y/o la vida de la madre.

2. El Estado debe definir la palabra "médico" y limitar la práctica del aborto, a un médico debidamente licenciado y proscribir a cualquier otra persona a realizarlo.

La legislación vigente en Puerto Rico queda supeditada a esta decisión legal, más no obstante, se ha presentado el Proyecto de la Cámara 33, del 16 de enero de 1993, con el propósito de realizar un "estudio exhaustivo sobre la necesidad y conveniencia de enmendar el Artículo 24 del Código Civil en lo concerniente al momento en que se considera nacido el ser humano".

En el propio enunciado y al analizar el proyecto, vemos realmente que lo que solicita es definir el momento en que un ser humano se define como "persona" o sea cuando comienza a tener derechos, por tener personalidad jurídica, todo relacionado al tema del aborto. Planteamos que llegar a conclusiones en un tema tan difícil donde los filósofos, los religiosos, los bioeticistas, los abogados y los médicos no logran un consenso, es un ejercicio de futilidad.

En conclusión, proponemos que la posición de la Asociación Médica de Puerto Rico sea de la siguiente forma:

1. la razón de ser de la clase médica es salvar vidas, no destruirlas, por lo tanto, se opone al aborto por petición
2. el estado de embarazo en la mujer es único y complejo, donde dos vidas conviven como una sola. La labor del médico es hacer todo a su alcance humano para salvar y/o ayudar a ambas a llegar a un alumbramiento, donde ambas vidas sobrevivan.
3. existen estados patológicos donde la sobrevivencia de una de las dos vidas afecta adversamente a la otra; (Ejemplo: pre-eclampsia severa, cáncer en la madre, eritroblastosis fetalis) y el médico tiene que tomar una decisión de cómo y cuándo intervenir en el proceso natural del embarazo para corregir el mal presente. Esta intervención debe ser una decisión ponderada y clínicamente responsable para ayudar a la vida afectada, respetando hasta donde se pueda, la vida y el bienestar de la otra vida. De surgir daño o incluso la muerte de la vida no afectada por la enfermedad, debe ser por daño indirecto del tratamiento.
4. el aborto en mujeres embarazadas contra su voluntad por incesto o violación, constituye un área de mucha controversia, y la decisión debe

hacerse luego de consultas legales, sociales y médicas.

5. el aborto por el hecho que el feto tiene una anomalía congénita que sea compatible con la vida luego de nacido (ejemplo: Síndrome de Down) no es aceptado. El aborto por razones de anomalías en el feto, incompatible con la vida (ejemplo: anencefalia) es generalmente aceptado, luego de consultar adecuadamente con todas las personas envueltas (la madre, el padre, geneticista, obstetra, director espiritual, etc.).
6. el aborto es un acto quirúrgico que puede causar serias complicaciones a la madre. Por tanto, debe insistirse que sea practicado por médicos debidamente entrenados en el campo de la ginecología. Las clínicas donde se practica el aborto deben cumplir con todos los requisitos de salud e higiene que se le requiere por ley a cualquier clínica donde se practica cirugía ambulatoria.
7. se respeta el derecho de todo médico a rechazar el practicar un aborto por razones de conciencia o convicción personal en contra del mismo.
8. los términos "persona", "derechos", etc. son legales y la Asociación Médica no debe entrar en polémicas de tipo judicial para tratar de armonizar la fase médica con la legal.
9. el "comienzo de la vida" es una percepción de tipo religioso e igualmente compete a los teólogos discutir el tema y no a la clase médica.
10. científicamente se puede acertar que el complejo cromosómico que caracteriza y dirige el curso de la vida biológica de cada individuo comienza en la unión de espermatozoide con el óvulo, lo cual ocurre en un período de aproximadamente 24 horas, luego de la ovulación. Una vez que el óvulo fertilizado comienza a dividirse y multiplicarse, se crea un momentum biológico el cual pasa por una serie de eventos clínicamente identificados (mórula, blástula, embrión, feto, recién nacido, infante, niño, adolescente, adulto, anciano, etc.) y que cesa solamente con la muerte.
11. la Asociación Médica de Puerto Rico reconoce el derecho constitucional de cada uno de sus miembros de actuar con su conciencia y dentro del marco legal de terminar, o no un embarazo por las razones permitidas por ley.

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Spinal Dural Arterio Venous Malformation

J. M. Padilla M.D., V. Rios M.D. F.A.C.S., W. Vega M.D., N. Rifkinson M.D., F.A.C.S.

immary: Spinal Dural AVM is the most common the spinal vascular malformations, representing 4% of all spinal cord masses. In Puerto Rico Medical enter it represent .1-1% of all spinal cord masses. e present a case in which Spinal Dural AVM was agnosed and treated less than one year after the ginning of symptoms. Ischemic changes of eversible nature were observed and corroborated imaging studies done after surgical intervention. e believe that irreversible damage starts to occur ice the arterio-venous fistula is formed.

Introduction:

Kendall and Lodge(1) distinguished two types of spinal arteriovenous malformations(AVMs): ral and intradural.

Dural AVMs were first recognized in 1977 by ndall and Lodge(1). Merland et.al.(2), further scribed this lesion as a radiculo-meningeal A-V ula. The nidus of the lesion is described as being bedded in the dura covering the proximal nerve t and in the adjacent spinal dura. They are supplied meningeal branches of the radicular arteries and in via the radicular veins accompanying the nerve t into an extended, dilated and tortuous coronal ious plexus. Dural AVMs are the most common of spinal arteriovenous malformations and are ught to be acquired. They are more common in les and usually manifest themselves in the fourth eventh decade with a medium age of 61.

ntradural AVMs are considered congenital lesions h symptoms developing during early adulthood. se are supplied by the anterior or posterior spinal eries or both. Intradural AVMs are classified ending on the localization in relation to the spinal d. They are subdivided into three subsets: extra-dullary, intramedullary, and mixed AVMs(1,3,4). ong the extramedullary AVMs two forms of AVMs recognized: extramedullary fistulae(5,6), and the retromedullary AVMs found on the posterior face of the cord(2,4). Intramedullary AVMs can be er glomus or of the fistulous type. Mixed AVMs ude intra and extramedullary lesions.

Dural AVMs commonly present with slowly gressive paraparesis with sensory and sphincter urbances, whereas intradural AVMs commonly present with acute incidence of paraplegia or paraparesis, secondary to subarachnoid hemorrhage or steal phenomenon. Lundquist et.al.(7) suggested that the clinical course of the spinal AVMs depend on the drainage. He found that those malformations which drain into dilated and tortuous medullary veins have a progressive course, usually subacute; those which drain to the epidural plexus or posterior spinal veins were more often associated with acute deterioration and hemorrhage.

The incidence of spinal AVMs is low, but with improved diagnostic techniques they are now more readily recognized. They are considered to represent from 3 to 4% of all spinal cord lesions(8).

In a review of the neurosurgical records from 1987 to 1992 at the Puerto Rico Medical Center and affiliated Hospitals, it was found that AVMs represent .1-1% of all spinal cord lesions.

Case Report:

A 61 year old man was admitted to the hospital with the chief complaint of progressive weakness and sensory loss of his lower limbs of two months duration. Ten months before, he suffered a fall onto his buttocks from a height of 8 feet without evident damage. Two months prior to admission he described walking difficulty and an oppresive sensation in the waist, associated with numbness of the lower extremities and a cold sensation in his legs. Low back pain with radiation to the left inguinal area was also present.

The pain and numbness increased with excersise, and improved with rest. During the week prior to his admission, constipation and an increase in urinary frequency appeared.

On physical examination, the patient was afebrile. Weakness of the pelvic girdle muscles and thigh muscles was more prominent on the left side. Hyperreflexia with bilateral Babinski sign were found. There was a decrease in pain and light touch extending from the inguinal area down both lower limbs. There was no atrophy or fasiculations in the lower extremities. The patient was admitted to the Neurology Service with a clinical diagnostic impression of cord compression at T12-L1 level.

Basic laboratories studies, including Prostate Specific Antigen and hepatic enzymes, were within

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normal limits. Spinal puncture was performed showing increased protein, levels but no pleocytosis. Chest x-ray showed no abnormalities, and thoracolumbar x-rays were within normal limits for the patients age. An MRI was read by the radiologist as an intramedullary neoplasic process versus a demyelinating process. Gallium scan was performed which showed increased uptake at parahilar nodules and was interpreted as a possible lymphoma versus "inflamatory process". A thoracic CT scan showed no significant nodules.

The patient continued to deteriorate during his stay at the hospital. No improvement with steroids was observed. His sensory level ascended to T10, and weakness of his lower extremities became worse. Three months after admission, the patient was evaluated by the neurosurgical service and was found with a radicular pain in the left inguinal area associated with a Bevor's sign. His gait was unsteady accompanied with frequent falls. He was no longer able to ambulate without assistance. At this time he developed urinary retention.

In a review of the MRI (fig.1) an atrophic cord was identified from the level of T3 to the level of T10, with associated intradural-extramedullary flow voids. In the T1 weighted image the affected spinal cord segment demostrated a central area of low signal intensity. This abnormality showed increase signal intensity in the T2 weighted image. Following gadopentetate dimeglumine administration, an intramedullary enhancing lesion was demostrated at the same level. It was concluded that these suggested either a vascular malformation with associated spinal cord ischemic changes, or a spinal cord neoplasm with associated enlarged feeding vessels.

Spinal angiography (fig.2) revealed a dural arteriovenous malformation with a single feeding branch from the left T12 radiculo-medullary artery.

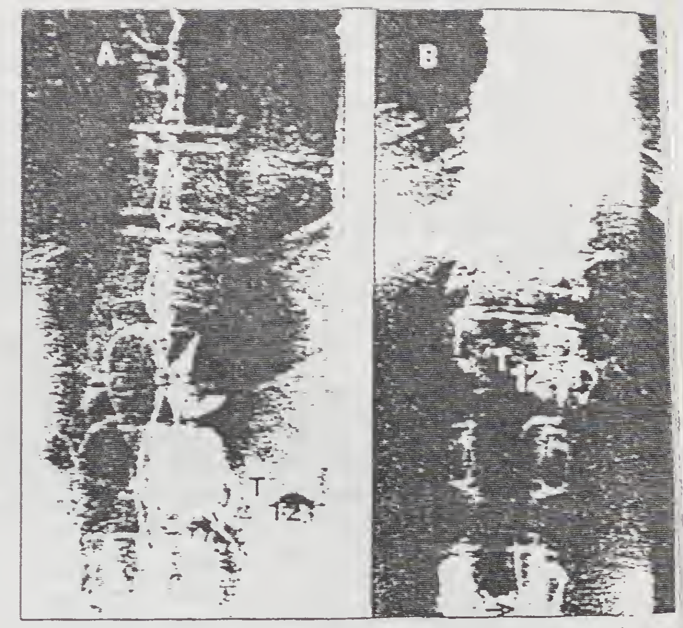


Fig 2. A) Selective injection of the left T12 intercostal branch shows a single feeding branch to an extensive thoraxic cord AVM(*), with prominent serpiginous vessels. (arrows shows the catheter into the left T12 intercostal artery). B). Post operative angiography with injection into same left T12 intercostal branch shows a normal vasculature, with no evidence of the thoracic spinal AVM. multiple other branches injected (not shown).

A laminectomy from T11-L1 was performed. After opening the dura, a large, tortuous, dilated draining vein was observed coming from the dura next to the left T12 root. The tortuous draining vein was ligated and cut thus eliminating the fistula effect. The nidus, which was embedded in the dura, was coagulated. On the first post-operative day the patient's radicular pain was no longer present, urinary retention subsided, and the sensory level returned to the inguinal region.

On follow up arteriography (fig.2.B), no residual vascular malformation was observed. On MRI (fig.3), 1 month after the operation, flow voids were absent, but in the T1 weighted images, a central hypointense signal in the spinal cord was still evident with

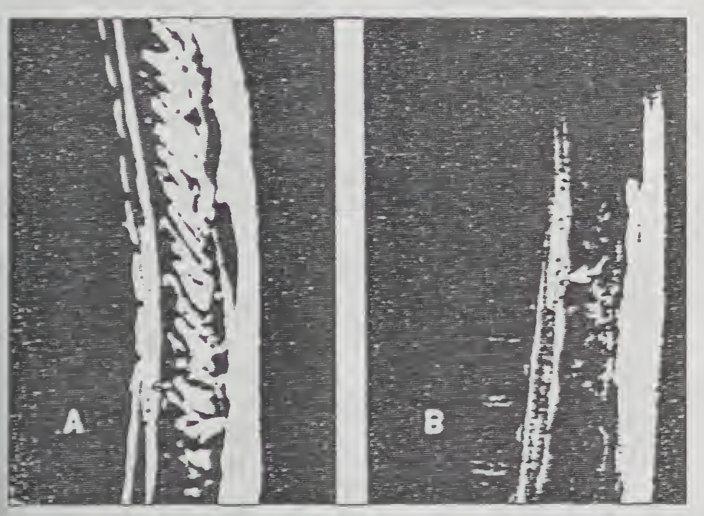


Fig. 1 A) MR Sagittal SE 4,000/160 image shows atrophy of the thoracic cord (arrow) from the level of T3 to approximately the level of T11. Intramedullary increased signal intensity is noted from T7 to T10 on basis of central infarction. B) MR sagittal SE 2,000/90 image shows multiple areas of flow void (arrow) within the thoracic sac posterior subarachnoid space consistent with abnormal vessels.

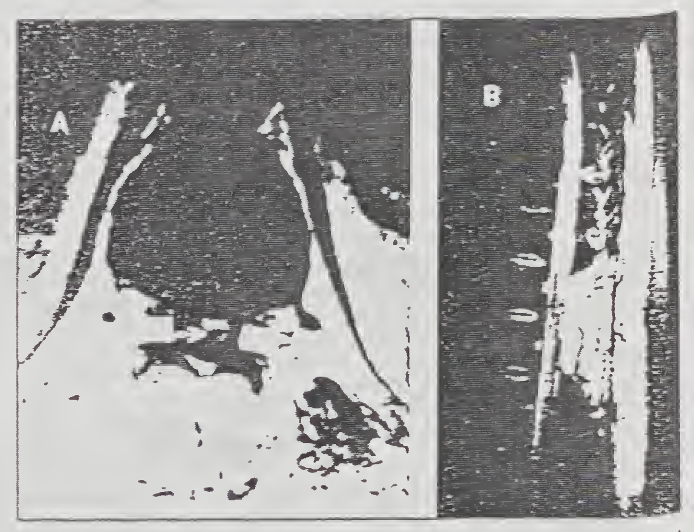


Fig 3. A) MR Axial SE 700/15 image shows a small focal low signal intensity region within the thoracic cord (arrow) consistent with infarction. B) MR Sagittal SE 2,500/90 image shows the postoperative laminectomy defect from T11 to L1 with persistent intramedullary region of increased signal intensity (arrow) within the thoracic cord consistent with infarction.

hyperintensity noted in the T2 weighted image; these findings are compatible with a residual ischemic infarct. The patient was transferred to the physical medicine and rehabilitation ward. He complained of an oppressive sensation in the suprapubic area, this most probably secondary to the cord ischemic infarct. He was discharged from the hospital ambulating with a cane. His gait was much steadier; the Babinski sign and hyperreflexia disappeared. However, the oppressive suprapubic sensation persisted. This residual unpleasant sensation is described by other authors as being of central origin ("central pain") (9).

Discussion:

This patient presented with the classical history of spinal dural vascular malformation, with pain, steadily progressive weakness and sensory symptoms of the legs, exacerbated by excercise (10). If the diagnosis had been reached earlier and surgical intervention undertaken, possibly the progressive infarction in symtomatology could have been presented.

Elevated venous pressure within the cord is esponsible for the neurological deficit(1). This fistula's enous drainage was to the coronal venous plexus, ying posteriorlly and laterally over the surface of the ord. The pressure and flow become elevated in these essels and the absence of valves facilitates the ransmission of high venous pressure to the radial nd intramedullary veins and consequently the cord arenchyma, causing congestive myelopathy. At this tage the blood-spinal barrier is disrupted, and nhancement with gadopentetate dimeglumine may e noted on MRI(8). Cord swelling, iso- or hypointense bnormalities in T1 weighted images, and hyper- tense abnormalities on T2 weighted images are hought to be due to edema and/or ischemia(9,11). hese findings are thought to be reversible if treatment s given on time(8,9,11). However, venous hyper- ension predisposes to stasis or thrombosis, secondary o congestion of the cord with subsequent necrotizing yelopathy, atrophy of the cord, and irreversible eurological damage. The correct diagnosis may be stablished by myelography, which will exclude a ompressive lesion and will demostrate the dilated, rtuous coronal venous plexus as serpentine linear efects. Arteriography, which may necessitate atheterization of all lumbar and intercostal arteries, ostocervical trunk, both vertebral arteries and both ternal and external carotid arteries, will usually emostrate the feeder of the AVM(12). MRI may be e initial imaging modality in patients with yelopathy. It will exclude a compressive lesion and ay demonstrate serpentine areas of low signal tensity, representing high flow in the arterialized ronal veins(fig.1). Minute cord scalloping in T1 eighted images has been reported as a useful sign to ggest a dilated coronal venous plexus(5).

The appearance on the MRI may cause some ifficulty in distinguishing AVMs from intrinsic spinal rd tumors or transverse myelitis. However, the atrophy of the spinal cord will distinguish subacute necrotizing myelopathy (SANM) from an intrinsic spinal cord tumor. The gradual worsening of the paresis over a period of several months without a response to steroids, will distinguish SANM from a transverse myelitis(13).

Successful outcome is dependent upon early recognition and treatment. The slowly developing distinctive pattern of symptoms and signs of a spinal dural AVM, should help in differentiating this somewhat rare entity from other spinal conditions.

Resumen: Malformaciones arteriovenosas durales de cordón espinal son las mas comunes entre las malformaciones vasculares de espina. Estas representan de 3-4% de todas las masas de espina. En el Centro Médico de Puerto Rico éstas son de .1-1% de todas las masas de espina. Presentamos un caso en donde la malformación fue diagnosticada y tratada menos de un año luego del comienzo de los síntomas. Cambios isquémicos irreversibles fueron encontrados por estudios de resonancia magnética hechos luego de operado el paciente. Creemos que el daño irreversible al cordón espinal comienza a ocurrir desde que la fístula arteriovenosa se forma.

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Penatal Care in Puerto Rico, 1978-1982

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Summary: A 1982 study in Puerto Rico collected data from 3,175 women, aged 15 to 49, on migration, education, employment, pregnancy outcomes, contraception, and marriage. Using these data, we described the correlates of receipt of adequate prenatal care for 318 women whose first live birth occurred between 1978 and 1982 and who had their first prenatal care visit in Puerto Rico. Weighted data were used for all analysis, thus, these 318 women represented approximately 87,000 women. All women received at least some prenatal care; 76.5% received adequate prenatal care (care beginning during the first trimester of pregnancy and consisting of at least seven prenatal visits). Statistically significant differences for receipt of adequate care were found for marital status, employment status, educational attainment, type of health-care facility of first prenatal visit, use of a family planning method, and age of mother. After controlling for age we found marital status, employment status, educational level, and type of health-care facility were associated with adequate prenatal care for women age 20 years or older. When controlling for facility, marital status and employment had a statistically significant association with receipt of adequate care for women who used a private facility. Our findings provide a basis for targeting women in Puerto Rico at risk of receiving inadequate prenatal care.

Key Words: Prenatal Care, Puerto Rico

Introduction:

Research shows an association between receipt of prenatal care and decreased incidence of low birthweight[1] infants (1-6). Low birthweight infants are at increased risk for neonatal death and long-terrn morbidity, including mental retardation and learning disabilities (7-10).

It is difficult, however, to establish why association between prenatal care and birthwei exists. Does prenatal care itself affect birthweight prenatal care-seeking behavior a marker for ot factors that affect birthweight; or, do these two fact work together to create the positive impact? Regardl of our ability to answer these questions, receipt prenatal care in the first trimester is crucial to t identification and management of existing medic and obstetric problems of the expectant mother. Ear identification of potential problems and appropria prenatal care can have a major impact on an infant' birthweight and chance for survival (11-14).

Although the infant mortality rate in Puerto Ric declined from 18.5 deaths per 1,000 live births in 197 to 17.3 in 1983 (compared with 11.2 in 1983 for the U.S mainland), the rate of low birthweight in Puerto Ric hovered around 9.0 (compared with 6.8% in 1983 fo the U.S. mainland) throughout this time period.

In 1978, Puerto Rico began including on the birth certificate questions about timing of care and tota number of prenatal visits. The first published prenatal care statistics appeared in the 1985 Puerto Rico Vital Statistics Annual Report (15). Analysis of 1980 birth certificate data for Puerto Rico demonstrated that almost all pregnant women received at least some prenatal care but there was not equal use of prenatal care services by all women (16). A similar analysis of 1986 Puerto Rican birth certificate data showed only 1.3% of Puerto Rican mothers did not receive prenatal care (17). The percentage of mothers who received their first prenatal care visit during the first trimester increased from 63% in 1980 to 70% in 1986, and the average number of visits increased from 8.2 in 1980 to 9.1 in 1986.

Most studies of prenatal care have been limited to analysis of information found on birth certificates or to evaluation of specific prenatal-care programs. A few studies have been based on national surveys

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[1] Less than 2,500 grams

conducted in the United States, but Puerto Rico was not included in these surveys. Birth certificate data had been the sole source of prenatal care information for the island until 1982 when the University of Puerto Rico and the Puerto Rico Department of Health, in collaboration with the Centers for Disease Control, conducted the Puerto Rico Fertility and Family Planning Assessment (PRFFPA), an island-wide survey of women of reproductive age.

The PRFFPA provides a second, unique source of prenatal care information that complements that found on the birth certificate. Analysis of this information more clearly defines the level of adequate prenatal care and increases understanding of the determinants of care in Puerto Rico. This knowledge provides a basis for targeting women in Puerto Rico who receive inadequate prenatal care.

Data and Methods:

The PRFFPA survey collected socioeconomic, demographic, and maternal and child health information for 3,175 women 15 to 49 years of age residing in Puerto Rico in 1982. The survey was based on a two-stage, disproportionate, stratified cluster sample representative of the island's population. A questionnaire was used to obtain from eligible women in each household complete history of all pregnancy outcomes, migration, education, employment, marriage, and use of contraception. The survey included several questions about the timing and frequency of prenatal care. These data complement vital statistics, clarify previous findings, and allow discrepancies between data sources to be identified. A fuller discussion of data collection procedures can be found in a previously published article (18).

Data quality checks included examination of internal consistency among event histories and comparison of PRFFPA data with data from vital statistics, census, and other surveys, with regard to age, marital status, fertility, and use of contraception (18). The data were found to be of good quality. The quality of prenatal-care variables was verified by using results from a study of birth certificate data (16) and unpublished vital statistics. The rates of receipt of earlier and more prenatal care in our survey was somewhat higher than that of the other sources. This difference is consistent with other comparisons of prenatal care data from U.S. surveys and U.S. vital statistics (19,20).

To control for parity, we limited the study to prenatal care for the first liveborn child. To account for recall bias, the population was further restricted to women whose first child was born between 1978 and 1982. Women whose first prenatal care visit was received outside Puerto Rico (5.3%) were eliminated from further analysis. The final study population consisted of 318 women.

The outcome variables used to measure receipt of prenatal care were total number of prenatal care visits and trimester prenatal care began. The recommendations developed by the American College of Obstetricians and Gynecologists served as the basis for our definition of adequate prenatal care (21). Our definition had to be adapted to correspond with the format in which the data were collected. For example, responses to the question on total number of prenatal care visits were collected for the following categories: 1-3 visits, 4-6 visits, and 7 or more visits. We defined adequate care as care beginning in the first trimester of pregnancy and consisting of at least seven prenatal care visits. Care not meeting both of these criteria was considered inadequate.

The type of health care facility used for the first prenatal care visit was collapsed into two categories, private facility and public facility. The public facility included visits to public hospitals and to public health centers. The private facility included visits to private hospitals and to physicians' offices.

The event history information made it possible to consider employment status, marital status, enrollment in school, and residence at time of conception as opposed to time of delivery. We estimated the time of conception by subtracting eight months from the infant's date of birth. As an indicator of socioeconomic status, woman's educational level at the time of the survey[2] was used instead of educational level at the time of conception.

The data were weighted to improve accuracy of estimates from the sample. The weights included an inflation factor based on the probability of selection, a nonresponse adjustment, a poststratification adjustment, and a final adjustment to achieve conformity with total population estimates for 1982 based on the 1980 U.S. census. The analysis was based on weighted data, although only the unweighted N's are shown in the tables.

We analyzed the data by using SAS and the SESUDAAN procedure for weighted data (22). Statistical significance was defined by 95 % confidence intervals. A variable was considered to have a statistically significant association with the outcome variable if the 95 % confidence intervals for the proportions of the two groups did not overlap.

Results:

The demographic characteristics of the study population are described in Table 1. Approximately 37 % of women were less than 20 years of age, 60.9% were 20 through 34 years of age, and 1.6% were 35 years of age or older. Eighteen percent of the women

[2] Referred to here as current education

were not married at the time of conception, 38.4 % were employed, and 17.4 % were in school at the time of conception About the same number of women lived in rural areas as in urban areas at the time of conception. Approximately 9% of participants spent most of their years until the age of 15 outside of Puerto Rico.

All of the women in our study received at least some prenatal care. Eighty-seven (87.5) percent had seven or more visits, 10.5 percent had four to six visits and 2.0 percent had one to three visits. Eighty (80.3) percent of the women began care during the first trimester, 17.2 percent began care during the second and only 2.5 percent began care during the third trimester. The percentage of women who reported early prenatal care was higher for women who had their first live birth five years before the interview date than for those with more recent first births. In 1978, 86.7 percent of the women reported seeking early prenatal care, whereas in 1982, 76.2 percent reported early prenatal care. (Data not shown.)

Overall, 76.5% of women received adequate (versus

Table 1. Weighted Percentage of Women Who Had Their First Live Birth Between 1978 and 1982 and Their First Prenatal-Care Visit in Puerto Rico, by Selected Characteristics

Characteristics	Percentage
Total	
(Unweighted N)	(318)
(Weighted N)	(86,869)
Age at first birth	
<=14	1.5
15-19	36.0
20-24	40.3
25-29	17.1
30-34	3.5
35-39	1.3
40-44	0.3
Married at time of conception*	
Yes	82.0
No	18.0
Employed at time of conception*	
Yes	38.4
No	61.6
In school at time of conception*	
Yes	17.4
No	82.6
Residence at time conception*	
Urban	50.1
Rural	49.9
Woman's residence until age 15	
Puerto Rico	91.0
New YorkCity	5.3
Other US mainland	1.6
Other	2.0
Woman's place of birth	
Puerto Rico	88.2
New York City	6.7
Other US mainland	2.2
Other	3.0
Current education level	
0-6th grade	8.2
7th-11th grade	26.2
High School or equivalent degree	32.7
Some college	20.7
College or higher degree	12.2

**Estimated by subtracting eight months from infants's date of birth.*

Table 2. Weighted Percentage of Women Who Received Adequate Prenatal Care for First Live Births Between 1978 and 1982, by Selected Characteristics

Characteristics	Adequate Care (95% CI)	Total N (unweighted)
Total	76.5 (71.5, 81.5)	(318)
Marital Status #		
Married	81.8 (76.6, 87.1)*	(261)
Not married	52.1 (38.7, 65.5)	(57)
Employed #		
Yes	89.8 (84.2, 95.5)*	(126)
No	68.2 (61.4, 75.0)	(192)
Current Educational Level		
<High School	63.0 (54.6, 71.3)*	(107)
>=High School	83.6 (78.2, 89.0)	(211)
Type of Facility		
Public	63.2 (54.1, 72.3)*	(141)
Private	87.6 (82.5, 92.8)	(177)
Family Planning		
Yes	86.6 (80.0, 93.2)*	(134)
No	69.5 (62.6, 76.5)	(184)
Age Group		
<20 years	65.3 (55.6, 75.0)*	(113)
>=20 years	83.2 (77.8, 88.6)	(205)
Residence #		
Urban	79.7 (66.9, 79.6)	(162)
Rural	73.2 (72.6, 86.9)	(156)
In School #		
Yes	71.6 (59.4, 83.7)	(54)
No	77.5 (72.2, 82.9)	(264)
Desire for Child +		
Yes	77.4 (72.1, 82.7)	(302)
No	55.2 (33.4, 77.1)	(15)
Mother's Place of Birth +		
Puerto Rico	77.3 (72.2, 82.4)	(278)
U S Mainland	69.6 (52.3, 86.9)	(30)
Mother's Place of Residence until Age 15 +		
Puerto Rico	76.2 (71.0, 81.4)	(290)
U S Mainland	81.0 (64.9, 97.1)	(21)

At time of conception.
* Statistically significant.
+ Some values do not add to column total due to unknown data for women in the subgroup. These women were excluded from analysis for the subgroup.

adequate) prenatal care as defined by the total umber of visits and the timing of the first visit. Of omen who received inadequate care, 47% began re after the first trimester, 16% received less than ven visits. and 37% began care late and received less an seven visits. Table 2 describes receipt of adequate re by selected characteristics. Statistically significant ifferences for receipt of adequate care were found r marital status, employment, current education, pe of health care facility of first prenatal care visit, se of family planning methods and age of mother. esidence, enrollment in school at time of conception, esire for child, woman's place of birth, and place of sidence until age 15 were not significantly related to ceipt of adequate care.

Due to the strong association between age and the other variables under consideration, we used a stratified analysis and controlled for age. Marital status, employment, current education, and type of health-care facility attended for first prenatal visit continued to have an effect on receipt of adequate prenatal care for women 20 years of age or older (Table 3). No variables remained significant for the less than 20 age group.

Socioeconomic status may also have confounded the analysis. In Puerto Rico, the type of health-care facility attended may be used as an indicator of socioeconomic status. Therefore, we also stratified by type of health care facility attended for the first prenatal care visit. Marital status and employment had a statistically significant association with receipt of adequate care for women who used a private health facility (Table 4).

able 3. Weighted Percentage of Women Who Received Adequate Prenatal Care for First Live Births Between 1978 and 1982, by Age of Mother and Selected Characteristics

	< 20 Years of Age		>= 20 Years of Age	
Characteristic	Adequate Care (95% CI)	Total N (unweighted)	Adequate Care (95% CI)	Total N (unweighted)
Total	63.7 (55.6, 74.9)	(113)	83.9 (77.8, 88.6)	(205)
Marital Status #				
Married	69.6 (58.7, 80.4)	(85)	88.3 (83.2, 93.3)*	(176)
Not Married	51.9 (35.2, 68.6)	(28)	52.3 (33.4, 71.2)	(29)
Employed #				
Yes	85.7 (59.3, 100.0)	(7)	90.1 (84.3, 95.9)*	(119)
No	63.9 (54.1, 73.6)	(106)	73.9 (64.3, 83.5)	(86)
Current Educational Level				
<High School	61.2 (50.1, 72.3)	(69)	66.4 (53.3, 79.6)*	(38)
>= High School	71.7 (58.3. 85.1)	(44)	87.0 (81.2, 92.8)	(167)
Type of Family				
Public	61.5 (49.3, 73.7)	(84)	65.9 (53.0, 78.7)*	(57)
Private	76.1 (58.6, 93.6)	(29)	90.1 (85.0, 95.3)	(148)

able 4. Weighted Percentage of Women Who Received Adequate Prenatal Care for First Live Births Between 1978 and 1982, by Type of Health Care Facility and Selected Characteristics

	Public Health Facility		Private Health Facility	
Characteristic	Adequate Care (95% CI)	Total N (unweighted)	Adequate Care (95% CI)	Total N (unweighted)
Total	62.4 (54.1, 72.3)	(141)	88.1 (82.5, 92.8)	(177)
Marital Status #				
Married	68.3 (57.9, 78.6)	(108)	91.8 (86.9, 96.7)	(153)
Not Married	47.2 (30.5, 64.0)	(33)	59.7 (38.6, 80.8)	(24)
Employed #				
Yes	66.8 (45.1, 88.5)	(19)	94.2 (89.6, 98.7)*	(107)
No	62.6 (52.9, 72.4)	(122)	78.1 (68.1, 88.1)	(70)
Current Educ Level				
<High School	59.9 (49.1, 70.7)	(81)	72.8 (55.9, 89.7)	(26)
>= High School	67.7 (54.5, 80.9)	(60)	90.2 (85.2, 95.3)	(151)
Age Group				
<20 years	61.5 (49.3, 73.7)	(84)	76.1 (58.6, 93.6)	(29)
>=20 years	65.9 (53.0, 78.7)	(57)	90.1 (85.0, 95.3)	(148)

At time of conception. – * Statistically significant. – Note: Not all percentages add to 100 due to rounding.

The variables for family planning, place of residence, enrollment in school at time of conception, desire for child, place of mother's birth and place of mother's residence until age 15 were also analyzed controlling for age and type of health-care facility. None of these variables was statistically significant.

Discussion:

Initial analysis of the PRFFPA data shows that being married, being employed, having at least a high school education at the time of the survey, having a first prenatal care visit at a private facility, using a family planning method prior to the first birth, and being more than 20 years of age had a significant association with earlier and more prenatal care. Women who were unmarried at the time of conception had the lowest percentage of care of any group. Only 52.1% of unmarried women received adequate care. Even after controlling for age and type of health-care facility, marital status continued to be associated with receipt of adequate care for women 20 years of age or older and for women whose first prenatal care visit was at a private health care facility.

Many women whose current level of education was less than a high school degree were the youngest women in the survey. It is not possible to know whether these women had less education because they were younger and, thus, did not have the opportunity to acquire more education, whether having a child at a young age ended their pursuit of education, or whether they decided to have children at a younger age because they had chosen not to continue their education. Nevertheless, after controlling for age, education was still associated with receipt of adequate care.

In the crude analysis and in the stratified analysis, when age or type of health-care facility was controlled, residence was not significantly associated with care. Residence may not play an important role in accessibility to care because of Puerto Rico's relatively small land area and the distribution of urban areas throughout the island.

This description of prenatal care in Puerto Rico contrasts sharply with use of prenatal care services by Puerto Rican women living in the United States who receive the least amount of prenatal care of any racial or ethnic group (23); in 1981, only 54% of these women received care in the first trimester. One in six Puerto Rican mothers received either no care or began care in the third trimester (24). Both Puerto Rican and Mexican mothers had the fewest prenatal care visits (9.5 and 9.3, respectively) when compared with black non-Hispanics (10.7 visits), white non-Hispanics (11.5 visits), and Cubans (11.3 visits) (24).

Most prenatal care studies rely on data collected on the birth certificate. The birth certificate provides a convenient, relatively low cost, and easily obtainable source of routinely collected information. However, these data have limitations. Birth certificate data tend to be biased toward underestimation of adequate prenatal care (21,22,25). Health-care personnel who complete the birth certificate may not know about prenatal visits received. Although the PRFFPA survey provided information not available on birth certificates, these data have limitations too. Survey data tend to be biased toward overestimation of adequate prenatal care. The respondent may deliberately misstate care in an effort to please the interviewer. Also, if the birth did not occur in the immediate past, recall bias may affect the reported timing and frequency of visits. We controlled for this latter problem by restricting analysis to the five years immediately prior to the survey date.

An advantage of using survey data from the PRFFPA was the variables employment, marital status, school enrollment, and residence were able to be considered at time of conception as opposed to time of delivery. Also, additional information was available, for example, desire for child, prior use of family planning methods, place of birth of the mother, and place of residence of the mother until age 15.

Length of gestation influences the number of prenatal-care visits a woman receives. In our study population, 3.5% of women delivered before the eighth month of pregnancy, and 5.3 percent delivered during the eighth month. Thus, 91.2% of participants had a full-term birth. Length of gestation was not controlled for in the analysis.

For some variables in the stratified analysis, at least part of the loss of statistical significance was due to the loss of power because of small sample size in certain cells. The patterns in the stratified analysis, however, remained the same as in the crude analysis.

The data collected during the PRFFPA survey allowed for analysis of timing of the first prenatal-care visit and total number of prenatal-care visits. No information was available about the content or quality of the care. Also, we were unable to consider the timing of visits subsequent to the initial visit.

Conclusions and Recommendations:

All women in our study received at least some prenatal care, but not all women received adequate care. These findings are consistent with those of Vázquez and Vázquez (16) and with vital statistics (15). Our results suggest factors associated with adequate care, which creates a basis for developing targeted interventions for women at risk of receiving inadequate care.

The PRFFPA survey provided a unique and comprehensive source of data that enhances our understanding of the use and determinants of prenatal care in Puerto Rico. However, data are needed that will allow for an analysis of the content and quality of services. In addition, knowing when all prenatal care visits occurred would provide a more complete understanding of the use of prenatal care services by pregnant women.

Acknowledgments:

The authors would like to acknowledge the contribution of Stephen E. Cramer, Ph.D., Coordinator of State Assessment Programs for the Georgia Department of Education, for his assistance with SAS programming, and the Office of Development and Information Systems in Puerto Rico for their help in providing us prenatal care vital statistics data tapes. Financial support for the PRFFPA was provided by the National Institute of Child Health and Human Development. Financial support for our study was provided by a grant from The Hewlett Foundation to Emory University, School of Public Health, International Health.

Resumen: En el 1982 un estudio nos permitió recopilar datos relacionados con migración, educación, empleo, anticoncepción, matrimonio y embarazos de 3,175 mujeres entre las edades de 15 y 49 años en Puerto Rico. Usando tales datos describimos los factores relacionados con haber recibido una atención prenatal adecuada en 318 mujeres quienes tuvieron su primer nacimiento vivo entre 1978 y 1982, y quienes tuvieron su primera visita de atención prenatal en Puerto Rico. Como nuestro análisis usó datos estadísticamente ponderados, estas 318 mujeres en nuestra muestra representaron a unas 87,000 mujeres puertorriqueñas. Todas las mujeres entrevistadas recibieron por lo menos algún tipo de atención prenatal; 76.5% recibieron una atención prenatal considerada como adecuada (primera visita en el primer trimestre y por lo menos 7 visitas prenatales). Con respecto a haber recibido una atención prenatal adecuada, se hallaron diferencias estadísticamente significativas de acuerdo al estado civil, empleo, escolaridad, sector de servicio, uso de métodos de planificación familiar y edad materna. Aun luego de ajustar por edad materna entre mujeres de 20 años o más, se halló asociación entre estado civil, empleo, escolaridad y sector de servicio con haber recibido una atención prenatal adecuada. El estado civil y el empleo mantuvieron una asociación estadísticamente significativa con haber recibido atención prenatal adecuada entre mujeres del sector privado. Nuestros hallazgos permiten delinear estrategias para lograr enfocar esfuerzos preventivos en aquellas mujeres en riesgo de recibir atención prenatal inadecuada en Puerto Rico.

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Aberrant Subclavian Artery: The Use of Digital Subtraction Angiography in the Difficult to Diagnose Case

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Víctor N. Ortiz, MD, FACS, FAAP

Summary: This is a case of a male infant admitted to Mayagüez Medical Center with symptomatic aberrant subclavian artery malformation manifested clinically by stridor, that after initial inconclusive esophagogram and echocardiogram studies, a venous digital subtraction angiography (VDSA) demonstrated its anatomical diagnosis followed by its succesful surgical management. VDSA is an excellent diagnostic tool that should be used in these rare cases where the esophagogram is non-diagnostic and an accurate, low risk diagnostic procedure is required for the diagnosis of aberrant subclavian artery in infants and children.

Introduction:

Aberrant or retroesophageal subclavian artery falls in a group of congenital cardiovascular malformations that result from faulty embryologic development of the aortic arch comprising less than 1% of all congenital cardiac malformations[1]. It is the most common vascular anomaly of the aortic arch and occurs in 0.5% of the population[2]. Fontana and Edwards (1962) estimated that this anomaly occurs in 1-200 people, and it is about 4 times more frequent in females than in males[3,4]. This condition is considered to represent persistence of right arch elements. It arises as the last branch of the aortic arch and pass obliquely form the left to the right arm, it may pass behind the esophagus, trachea or very rarely in front of the trachea.[5-6-7-8-9] (Fig. 1).

The majority of cases are asymptomatic but when symptoms occur they result from compression of the trachea and rarely (at adult life) as dysphagia. Stridor is the most frequent prominent symptom and may be associated with periodic episodes of serious respiratory distress especially at feeding times.

The suspicion of the diagnosis of aberrant subclavian artery or any other vascular ring malformation is usually confirmed by esophagography and arteriography, but complications associated with arteriography are severe enough that its use should be

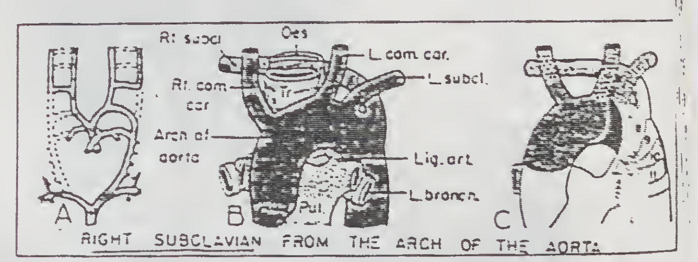


Figure 1. A,B,C, Retroesophagel Right Subclavian Artery (A, from Patten 1968; B, from Edwards 1948; C, after Barry 1951).

reserved for those cases in which diagnosis by esophagography is inconclusive [10-12-13]. This case report will discuss the use of venous digital subtraction angiography (VDSA) as an alternative method for diagnostic confirmation of aberrant subclavian artery in a young patient in whom diagnosis by esophagography was inconclusive[14]. The use of VDSA obviated the serious complication of transarterial angiography, while providing a definitive diagnosis[14,15].

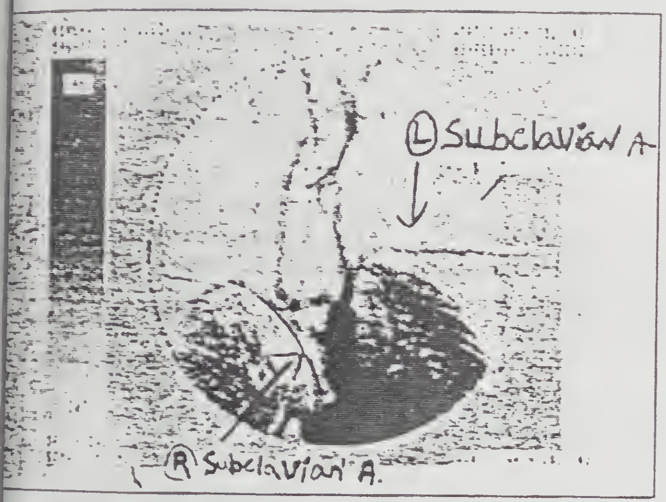
Case Report:

This, otherwise healthy, seven months old male infant was admitted to the Mayagüez Medical Center with acute gastroenteritis. Careful history and physical examination revealed that he was having intermittent stridor which had been present for approximately 4 months prior to admission. An esophagogram was performed showing suggestive, but non-diagnostic changes of vascular ring malformation. Laryngoscopy and bronchoscopy were negative. An echocardiogram was performed, demonstrating no abnormal findings. To minimize the risks, and complications of conventional arteriography in this infant, a VDSA was performed showing an anomalous right subclavian artery.(Fig. 2).

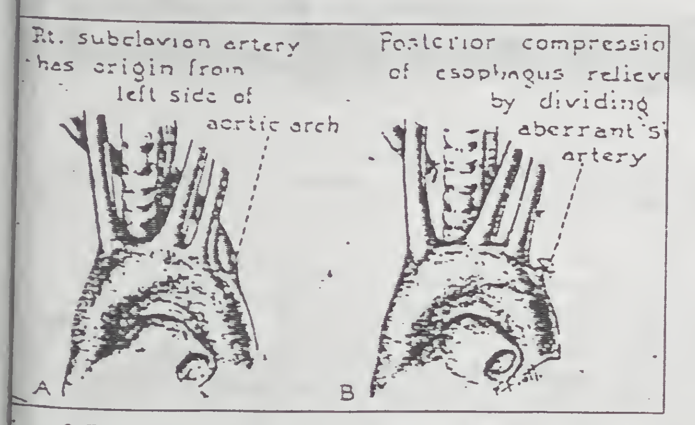
Once the diagnosis of anomalous right subclavian artery was confirmed, a successful left thoracotomy with division of the aberrant right subclavian artery was performed.[6,11,12,13,14] [16,17,18,19,20] (Fig.3). The infant was discharged home on his fourth postoperative day without complications. One month later the patient

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as seen in the outpatient clinic and found to be ompletely asymptomatic with a well healed oracotomy scar.



igure 2. *VDSA of right Aberrant Subclavian Artery as indicated y lower oblique arrow.*



igure 3. *Retroesophageal Right Subclavian Artery constricting e esophagus. A, Anatomical relationships. B, surgical relief by ouble ligation and division of the Aberrant Subclavian Artery. rom Gross 1953).*

Discussion:

The challenging aspects of this unusual case is ased on the fact that the patient was symptomatic, owever the esophagogram did not help in stablishing the diagnosis, this is contrary to the rule, here the majority of the cases show mild to no ymptoms and the diagnosis is inferred due to an bnormal esophagogram ordered for other purposes. n older children and adults, but not in infants, the sophagogram impression is so characteristic(Fig. 4) hat no further radiographic investigation is equired[15,16,17,18]. The specificity and sensitivity of the sophagogram in the determination and identification f this condition is not clearly established. It probably epends on the exact location of the aberrant vessels nd size of the esophagus. In infants, all these tructures described previously are smaller and for his reason the characteristic impression found in the esophagogram can be absent. In this case an echocardiogram was done in an attempt to avoid the use of invasive procedures for the diagnostic confirmation of this defect, but it was not sensitive enough to be helpful. Laryngoscopy and bronchoscopy failed to show any upper respiratory obstruction as cause for this patient's stridor.

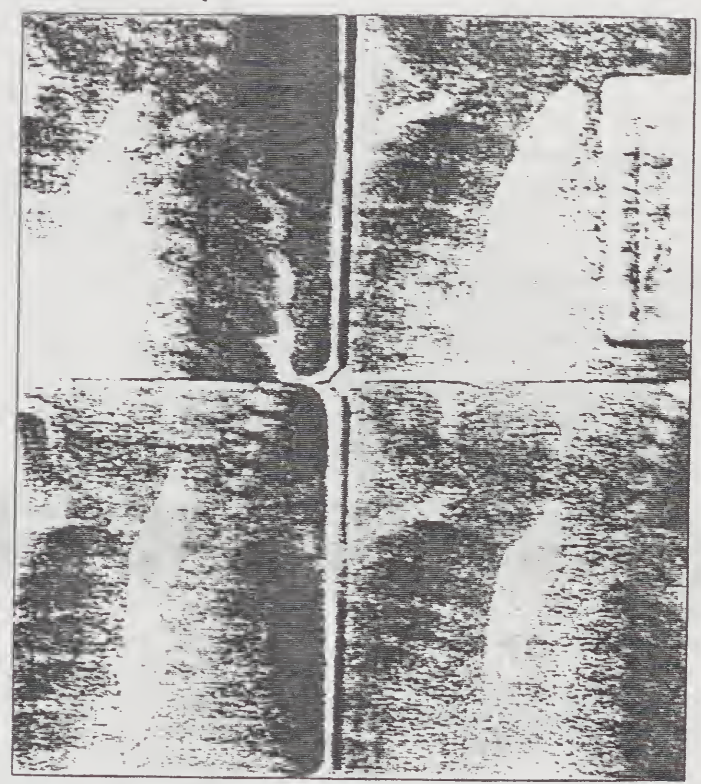


Figure 4. Characteristic radiographic impression of a right Aberrant Subclavian Artery. On the frontal view the esophageal indentation runs obliquely upward and to the right.

Because the goal standard for diagnostic confirmation of vascular ring malformations is arteriography we decided to perform a VDSA as our next diagnostic modality. In order to avoid the possible complications that may be associated with intra-arterial injection of contrast media in infants; such as embolism, ischemic limbs and nephrotoxicity, we selected the intravenous route. Infants have small caliber vessels and less capability to concentrate and excrete the injected contrast medium. With the use of VDSA we increase contrast sensitivity that results in a decreased in contrast load; this results in a decreased in toxicity, primarily nephrotoxicity and less patient discomfort, while minimizing the risks associated with intra arterial route such as embolization and limb ischemia[19].

In spite of the risk of hypersensitivity results associated with contrast medium, we consider that VDSA is a relative low risk diagnostic tool when compared with conventional arteriography and it should always be considered when invasive methods are needed to establish the precise anatomic nature in the differential diagnosis of vascular ring malformation.

INDEX WORDS: Aberrant Subclavian Artery, Digital Subtraction Angiography

Resumen: Este es el caso de un infante masculino admitido al Centro Médico de Mayagüez debido a una malformación aberrante de la arteria subclavia que se manifestó clínicamente con estridor y que luego de estudios no concluyentes de esofagografía y ecocardiografía se tuvo que utilizar la angiografía de substracción digital venosa para confirmar el diagnóstico y reducir los riesgos asociados con la vía intraarterial.

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Articulos Originales:

Inflamatory Pseudotumor of the liver: Case Report

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Carmen Santiago, M.D. and Angel Isidro, M.D.

Summary: Inflammatory pseudotumor of the liver is a rather infrequent clinical and pathological entity of relatively recent recognition. Few cases have been reported by this term although apparently a similar condition has been reported with other synonyms such as: inflammatory myelofibroblastic tumor, post-inflammatory tumor and plasma cell granuloma. A similar pathologic entity has been reported in the lungs, the etiology of which is unknown as of today. We wish to report a case which we believe complies with the criteria which have been established, although, it presents as multiple hepatic lesions rather than solitary.

Case Report:

A 28 years old construction worker was brought to the hospital on 9-20-90 because of 3 weeks history of right upper quadrant pain associated with chills, fever, anorexia, weakness and weight loss. No previous history of such epidoses. No history of food intolerances, alcohol or drug abuse, abnormal sexual practice, blood transfusions or jaundice. No previous operations. Physical examination revealed a well developed, somewhat obese young white man who appeared acutely ill. BP 120/60, T 37.5 C, P - 90. No skin rashes detected. No jaundice. Some RUQ tenderness but no viscera or masses were felt. No ascites. Laboratory: WBC on admission 16.1 X 10 RBC: 4.28 M/cu.mm. Hgb:12.1 G% PT/PTT within normal limits, AST 65 (0-40); Alk. Phosphatase 140 (60-168) Sed. Rate 100 m/hr. Stools for occult blood negative. Hepatitis profile for A and B negative, Mono test negative, blood cultures taken on 3 occasions negative. Ceruloplasmin, alpha, anti-trypsin, alpha -feto protein, anti-smooth muscle antibodies, and antiamebic antibodies were all negative or within normal limits. Culture from pleural effusion and from bronchial washings were also negative. Ultrasound study of the upper abdomen reported as compatible with multiple metastases to the liver. Gallium scan of the liver suggestive of multicentric hepatoma. Computarized tomography of the abdomen reported multiple metastases vs. multiple angiomas. Liver angiogram by labelled RBC's reported negative for angioma. A blind liver biopsy reported as showing congestion and fibrosis. An ultrasound guided needle liver biopsy reported as showing moderate steatosis and mild portal fibrosis, acute and chronic inflammation but negative for malignancy. An open wedge biopsy of the liver was obtained that yielded a 1 X 1 X 0.5 cm. specimen which revealed complete replacement of the normal architecture of the focal area by a fibrotic mass with focal hemorrhages, acute inflammation, foamy histiocytes and focal necrosis, with a note stating the differential diagnosis and the impression that the lesion was inflammatory pesudotumor. Because inflammatory pseudotumor is a diagnosis of exclusion, an exhaustive search of the history and possibilities was conducted. Clinicians, surgeons, radiologists, infectologists and pathologists were consulted. Finally, with the impression that this was an inflammatory pseudotumor the case was sent to the Armed Forces Institute of Pathology for final evaluation that included hemangioepithelioma stains (Factor VIII to rule out epithelioid hemagioepthelioma). Upon completion, the AFIP confirmed the diagnosis of inflammatory pseudotumor.

The patient was treated with broad spectrum antibiotics including Cipro, Primaxin, Amikin, Flagyl as recommended by the infectologist presumming it was liver abscess before final pathologic report was available. There was gradual improvement of the patient manifested by gradual recesion of fever spikes down to normal. Increase in appetite and body weight and improvement o his RUQ pain was noted. He was discharged 42 days after admission. He returned to work and was doing well 4 months and one year after discharge. A repeat computarized tomography of the abdomen in his last visit revealed resolution of the previous process.

Discussion:

Pseudoinflammatory tumor of the liver has been infrequently reported. Chen(1) reported one case and mentioned three additional cases previously reported in the literature. Pu Telesinghed added 5 additional cases not previously reported. In most cases either hepatic abscess or malignancy was suspected. Our

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case was no exception. The clinical picture on admission was highly suggestive of hepatic abscess though no etiologic source could be identified. Subsequent studies, ultrasound, gallium and computerized tomography suggested malignancy. The picture was complicated by the negative needle liver biopsies for both malignancy and infection. Finally, after open liver biopsy and extensive consultation the final diagnosis of inflammatory pseudotumor of the liver was established. Of note in this case is the fact that the lesions were multiple, whereas most all other reported cases were solitary lesions. Because of the exclusion of all other possibilities, we propose that inflammatory pseudotumor was present as multiple lesions. The patient received a wide variety of antibiotics such as (Cipro, Amikin, Primaxin, Flagyl) etc... The effectiveness of this therapy in the final resolution of the hepatic lession is unknown. However, spontaneous resolution of inflammatory pseudotumor is the rule.

Acknowledgement:

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Resumen: Tumor pseudoinflamatorio del hígado es una entidad que ha sido infrecuentemente descrita con otros sinónimos tales como tumor inflamatorio mielofibroblástico, tumor post inflamatorio y granuloma de células plasmáticas. Nosotros describimos un caso que creemos cumple con los requisitos de esta entidad y que demuestra múltiples lesiones en vez de solitarias como usualmente se presenta. El cuadro clínico fue confuso y sugirió un abceso hepático y también neoplasma en ultrasonido y tomografía computarizada. Una biopsia hepática abierta fue necesaria para confirmar el diagnóstico.

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Clinical Application of Signal Averaged Electocardiography and Detection of Late Cardiac Potentials

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Luis Soltero, M.D.; Jaime Ruiz, M.D.; Miguel López, M.D.

Summary: The signal averaged electrocardiogram (SAECG) has become a very useful non invasive test to identify delayed activation in an abnormal region of the left ventricle. The delayed activation or late potentials have been observed in patients with recurrent ventricular tachycardias, ventricular aneurysms, dilated or hypertrophic cardiomyopathies and myotonic dystrophy. The criteria for abnormal late potentials in a SAECG are presented and their clinical applications in patients with organic heart disease are thoroughly discussed.

The signal averaged electrocardiogram has emerged as a very useful non-invasive tool for identifying low amplitude, high frequency cardiac depolarizations that are not apparent on the standard 12 lead ECG. These low amplitude, high frequency cardiac depolarization or late potentials extend beyond the terminal portion of the QRS complex. They are believed to be generated by delayed activation in an abnormal region of the heart, usually the left ventricle (1).

Historial Development:

The earliest work in late potentials recordings came from the animal laboratory using direct-contact epicardial or endocardial electrodes. In 1973, it was shown that potentials originating from ischemic regions of the canine heart were delayed beyond the end of the QRS complex (2). Our group developed in 1974, an animal model for consistently reproducing late potentials in dogs with four day old myocardial infarctions (3-4). Further studies showed that these late potentials could disappear after anti arrhythmic drugs were administered to the animal model (5). These same studies demonstrated the pro-arrhythmic effects of anti arrhythmic agents which could exacerbate late potentials. Multi electrode recording verified these late activated areas as the substrate for ventricular reentry and ventricular tachycardia (6).

Clinical Correlations:

Initial clinical studies of late potentials in humans, recorded from the endocardial and epicardial surfaces of patients with ventricular tachycardia were reported by Dennett and Other in 1978 (7).

They showed that these late potentials represent slow and irregular propagation of the electrical impulse in abnormal myocardial tissue. Micro electrode studies performed in these abnormal myocardial tissue have shown the presence of non conducting cells with no evidence of depolarization, poorly conducting cells with poor phase 0 of the action potential as well as normal appearing action potentials.

High Resolution Electrocardiography and Signal Averaged Electrocardioqraphy:

The initial report of late potentials recordings from the body surface utilizing high resolution electrocardiography (HRECG) and computer processing was published by Berbari et al in 1978 (6). His method included a computer implemented signal averaging, high pass filtering and feature extraction to characterize the late potentials.

Immediátely, following his report, it was demonstrated that this technique was useful to record late potentials in humans (8). Both reports re-affirmed that these late potentials recorded from the body surface correlated in time with direct epicardial recording of late potentials reported earlier.

Clinical Applications:

1. Left Ventricular Aneurysm and Ventricular Tachycardia.

The main clinical application of HRECG has proved to be of great clinical interest in identifying patients at risk of life threatening ventricular tachycardia following an acute myocardial infarction (9).

Late potentials were observed in patients with

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recurrent ventricular tachycardias and ventricular aneurysms. Interesting enough, the authors noted that the late potentials disappeared after aneurysmectomy particularly if ventricular tachycardias were abolished. Another study showed that although abolition of late potentials was not a primary indication of a successful surgical removal of reentrant circuits, late potentials were always absent after left ventricular aneurysmectomy and successful termination and prevention of recurrent ventricular tachycardia.(10)

2. Late Potentials after Myocardial Infarction:

The hypothesis tested in studies involving patients with recent myocardial infarctions is whether the presence of late potentials identified those patients in whom malignant ventricular arrhythmias (ventricular tachycardia, fibrillation) are going to occur. In general, the studies reported agree that the presence of late potentials in patients who have had myocardial infarctions are strong predictors of subsequent occurrence of ventricular tachycardia (10-11).

Prediction by late potentials measurements is independent of both Holter events and determination of ejection fraction (12). Recent observations have confirmed that late potentials in patients who have sustained an acute infarction, individually provide the strongest predictive index of eventual ventricular tachycardia and when combined with an index of ventricular performance and Holter data, provide the best prediction for the eventual development of ventricular tachycardia. Recent evidence indicates that successful thrombolytic therapy in patients with an acute myocardial infarction is associated with a marked reduction in the incidence of late potentials in the signal averaged electrocardiogram (12).

3. The Signal Averaged ECG as a Screening Test for Inducibility of Sustained Ventricular Tachycardia.

In a recent report, 100 consecutive patients with syncope, ventricular tachycardia and sudden cardiac arrest were studied (13). Using programmed ventricular stimulation, the patients were divided in 2 groups; group I was made up of patients who did not have inducible monomorphic ventricular tachycardia. Group II had inducible monomorphic VT. Their results showed that signal average ECG was the best predictor of induction of sustained monomorphic VT.

Implications for Clinical Management

In patients with both a history of sustained VT (or syncope) and the presence of late QRS potential, programmed ventricular stimulation will reveal inducible ventricular tachycardia. Therefore, from a diagnostic standpoint, programmed ventricular stimulation will not contribute additional information, but will be of value in the selection of appropriate therapy for V.T.

In those patients with sustained VT (or syncope) without late potentials on signal averaging, sustained ventricular tachycardia is rarely inducible and programmed stimulation may not be the best diagnostic tool. Treadmill testing, tilt testing and/or coronary arteriography may be of greater diagnostic value.

In these patients, programmed ventricular stimulation could be performed latter if the initial diagnostic work up are negative or normal. Programmed stimulation may be justified in this group of patients by the catastrophic initial clinical presentation and the potential for a false negative signal average results as seen in patients with bundle branch block.

4. Signal Averaged ECG and Risk Stratification of Patients with Organic Heart Disease.

A very useful clinical study recently reported (14) summarized a risk stratification chart using signal averaged ECG, left ventricular ejection fraction (obtained by radionucleide ventriculography) and programmed stimulation in patients with organic heart disease (coronary artery disease or idiopathic dilated cardiomyopathy) and non sustained ventricular tachycardia. As known, these groups of patients are frequently seen in our daily practice of cardiology.

The study showed that patients with an ejection fraction of 40% or greater and no late potentials on the signal averaged ECG do not require testing by programmed ventricular stimulation and do not require long term anti-arrhythmic therapy because of inducible sustained monomorphic VT is 0% and the risk of sudden death in 3 years is very low (7%).

On the other hand, patients with late potential on the signal averaged ECG and EF <40% should have a complete electrophysiologic evaluation and programmed ventricular stimulation. 60-70% of this group (EF <40% (+) late potentials) will have inducible monomorphic ventricular tachycardia.

The latter group could be further stratified. Those patients with no inducible VT (30-40%) as well as those with inducible non sustained VT could be followed with no anti arrhythmic therapy. The 3 year sudden death rate (death due to ventricular arrythmia) in this subgroup is 9%.

On the other hand, if sustained monomorphic VT is induced, anti-arrhythmic therapy guided by programmed ventricular stimulation could be started. The three year sudden cardiac death rate in this group receiving anti-arrhythmic therapy guided by programmed ventricular stimulation was 19%. (Table l)

5. Other Clinical Applications of Signal Averaged ECG for the Detection of Late Potentials:

A) Assessment of Left Bundle Branch Block.

Left bundle branch block particularly with left axis deviation is frequently a marker of significant organic heart disease. To assess the role of signal averaged ECG in patients with LBBB and either complex

Table 1. Risk Stratification Protocol for Patients with Organic Heart Disease and non Sustained Ventricular Tachycardia

1. Those patients with EF >40% and negative late potential should not receive anti arrhythmic therapy.
2. Patients with EF >40% and positive late potentials should have programmed electrical stimulation of the heart (PES).
3. All patients with EF <40% and positive late potentials should have PES. Those with negative late potentials should also have PES since 10% of then will have induced monomorphic sustained ventricular tachycardia.
4. If sustained monomorphic VT is induced PES guided therapy should be started.
5. If no sustained VT is induced or if no VT is induced anti-arrhythmic therapy is not required.

ventricular arrhythmia, syncope, sustained monomorphic VT or other symptoms, the group from the Mayo Clinic evaluated 41 patients prior to electrophysiologic testing. After testing, they were followed for 11 months. During this follow up period, there were 12 sudden deaths and six patients with sustained monomorphic VT. Some others had sustained monomorphic VT at EP testing only.

The presence of late potentials on signal averaged ECG correctly identiffed 84% of patients with subsequent events. Together with the ejection fraction, signal averaged ECG predicted 96% of events. The use of signal averaged ECG improves the clinician ability to predict arrhythmic events in patients with LBBB, ventricular arrhythmias and/or neurological symptoms (14).

B) Late Potentials and Hypertrophic Cardiomyopathy.

In patients with hypertrophic cardiomyopathy (HCM), prediction of sudden death based on clinical criteria may be unreliable. A recent report presented at the ACC meeting in 1991, evaluated the role of the signal averaged ECG in 31 patients with HCM all of whom had 48 hour Holter recordings (8 with non sustained VT and 1 with sustained VT). Twelve of the patients had histories of sudden death. Amiodarone was used by 15 patients. 23% of the patients had positive late potentials and were not influenced by the use of amiodarone or the degree of hypertrophy. Of the 4 patients with life threatening arrhythmias, 3 had signal averaged ECG abnormalities.

A very thought provoking report from the National Heart, Lung and Blood Institute showed that abnormal QRS prolongation >120 msec, root mean square QRS voltage <20 uV and low amplitude signals are seen in 0%, 6% and 6%- respectively in a normal population.

In 15 patients with HCM, these abnormalities were present in 13%. 20% and 33% of patients respectively. The first degree relatives of these patients were also studied. The echocardiographic tracings of the relatives were all normal and 26% of them had abnormal ECG. In spite of the normal echocardiogram, the abnormal QRS prolongation, abnormal root mean square voltage and low amplitude signals were present in 3%, 13% and 32% of relatives respectively (14).

C. Ventricular Late Potentials and Myotonic Dystrophy.

Sudden death has been reported to occur in 15% to 30% of patients with myotonic dystrophy (15). Although commonly attributed to conduction block, sudden death has been seen in myotonic dystrophy patients with permanent pacemakers. A recent report tends to confirm the possibility that spontaneous ventricular tachycardia plays a role in the sudden death of patients with this type of muscular dystrophy.

In this report 75%, 67% and 29% of a group of patients with myotonic dystrophy showed one, two or three criteria respectively for the presence of late potentials; (total QRS duration >114 msec, root mean square voltage of the terminal 40 ms <than 20 uV, terminal portion of the filtered QRS complex >38 ms).

These observations suggest that since the prevalence of late potentials in patients with myotonic dystrophy approaches that seen in cardiac patients with ventricular tachycardia, ventricular arrhythmias play a role in the occurrence of sudden death in some patients with myotonic dystrophy. Other useful applications of signal averaged electrocardiography are shown in TableII.

Table II. Clinical Indications for Signal Averaged ECG.

1. In patients with myocardial infarctions.
2. In patients with LV aneurysm irrespective of the etiology.
3. To assess inducibility of sustained ventricular tachycardia.
4. To stratify risk in patients with Organic Heart Disease and non sustained ventricular tachycardia.
5. Assessment of patients with left bundle branch block and clinical symptoms.
6. In patients with hypertrophic cardiomyopathy.
7. In patients with Myotonic dystrophy.
8. Identifying early rejection in patients who have undergone cardiac transplantation (under study).

Methodology and Technique to Obtain Reliable Criteria for Late Potentials by Signal Averaged ECG Technique

As previously mentioned, different methods have been used to record late potentials from the body surface. The primary problem is that late potentials are usually 100 times smaller that the QRS and cannot be observed with a standard ECG machine. Specially designed systems are required to obtain these signals. The following general approach should be followed. (16)

Electrocardiographic Leads Used to Obtain SAECG (x y z Leads)

An orthogonal bipolar x y z lead set is most commonly used (Figure 1) and is defined by locating the left midclavicular line. This is the y axis. The negative y electrode is placed in the subclavian space and the positive y electrode is placed in the lower thoracic quadrant.

The z axis is the antero posterior line, which intersects the y axis at the fourth inter costal space. The anterior electrode is positive with respect to the posterior electrode.

The x axis is the horizontal line that intersects the y and z axis at a right angle. The positive x electrode is on this line at the left mid axillary line.

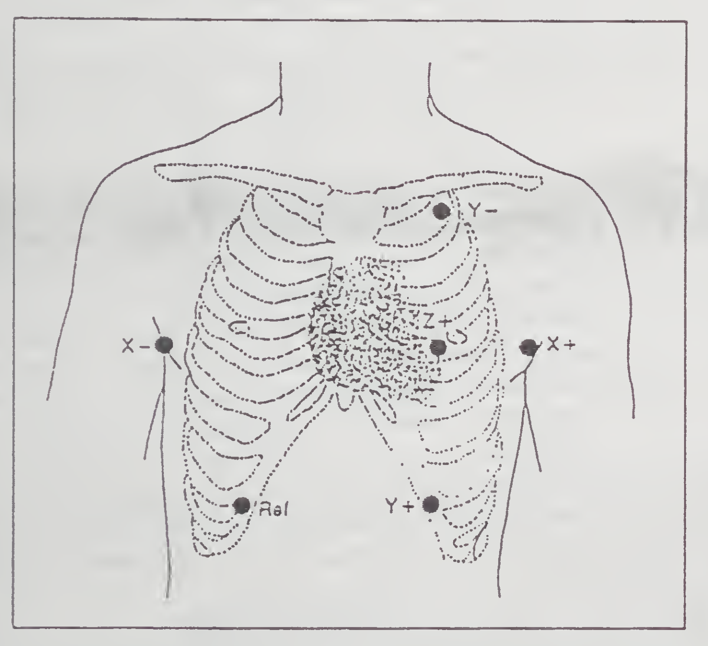


Fig. 1. Location of electrodes for X y Z leads for signal averaged electrocardiography.

Computer Software Needed to Obtain SAECG

The electronic amplifier must be of the highest quality and be able to eliminate 60 Hz power line interference. The x y z analog signals are then digitalized by the computer using an analog to digital converter. The sampling should be made at 2000 Hz per channel and 16 bit resolution. The latter specification will not distort the relatively large QRS signal and will still be able to resolve the much lower level late potential signal.

The computer software will detect and align x y z signal with respect to the QRS complex. As each new beat is recorded, the respective x y z signals are added to the prior beats. This method of summation or signal averaging will reduce the effects of noise and will improve the signal to noise ratio. Signals that are synchronized with the cardiac cycle will be preserved in the averaging process while those that are random such as electro myographic signals will be reduced eventually to zero. In practice 100 to 300 cardiac cycles are used to achieve useful averaged signals. After averaging, there is a tenfold increase in the time scale and a fivefold increase in the voltage scale. The terminal portion of the QRS complexes will then show higher frequency components that are identifiable but not easily quantified. High pass filtering is then used to reduce low frequency signals of the ST slope and T wave. After filtering, the QRS complex will then appear as a large multiphasic wave form with terminal bumbs, these are the late potentials. (Figure 2)

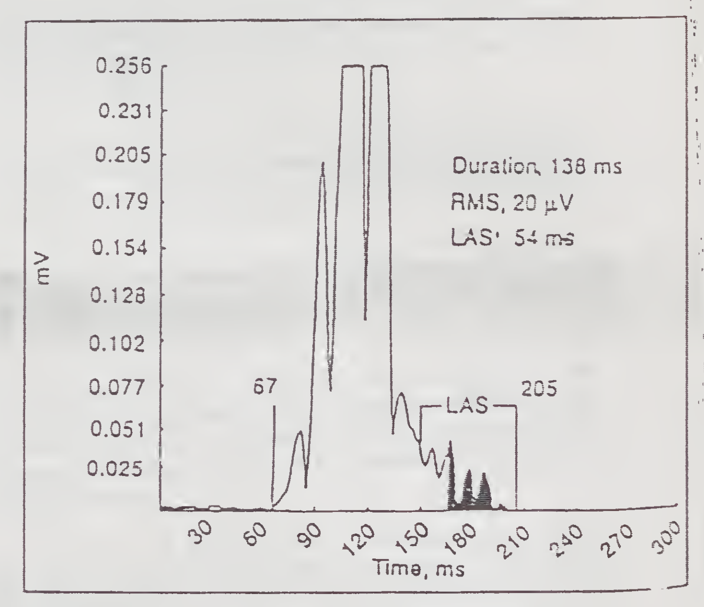


Fig. 2. Positive late potentials in signal averaged ECG.

Measurement of Late Potentials in the SAECG

Several measurements have been derived from the filtered vector to define the late potentials. The choice of the termination of ventricular depolarization; either the end of the QRS or the end of a late potential after the QRS, is the most critical factor that determines the value of these measurements. Rather than make the distinction between the QRS and a late potential, it is common to redefine the duration of the combined wave forms (QRS and late potential) as the total QRS duration. The concept of normal myocardial depolarization time and abnormal conduction through a diseased region are combined into a single measurement.

Once the duration is calculated, he energy within the terminal QRS is computed using the root mean square method. This measurement is made during the terminal 40 msec of the QRS as is the region that is shaded in Figure 2. The duration of the terminal portion of the QRS that is below a predetermined amplitude is the third measurement. The duration of this low amplitude signal is from this point to the end of the QRS.

The most difficult aspect of all these measurements is the proper identification of the end of the late potential. Unfortunately there is no way to judge this perfectly. Until the computer algorithms are validated, it is still appropriate to observe the computer chosen end points and compare at least two or three repeated averages to rule out obvious mathematical errors .

The three best criteria to define positive late potentials in the SAECG are summerized in Table III.

Table III. Criteria for Abnormal Late Potentials in a Signal Average Electrocardiogram.

1. Total QRS duration of the filtered vector of more than114 msec.
2. A root mean square voltage of the terminal 40 msec. < 20 uV.
3. Terminal portion of the filtered QRS complex under 40 uv for more than 38 msec.

Resumen: El electrocardiograma de señales promediables (ECGSP) es una prueba no invasiva sumamente útil para identificar activación retardada en un segmento patológico del ventrículo izquierdo. La activación retardada o potenciales tardíos se han identificado en pacientes con taquicardia ventricular recurrentes, aneurisma ventriculares, cardiomiopatías dilatadas o hipertróficas y distrofia miotónicas. Los criterios para identificar los potenciales tardíos en el ECGSP y sus aplicaciones clínicas en pacientes con enfermedad orgánica del corazón se presentan y discuten en detalle.

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Cardiac Pacemaker Tachycardias - Part I

Charles D. Johnson, M.D., FACC

Summary: This work addresses, discusses and reviews the many types of tachycardias associated with cardiac pacemakers, with which the modern physician may be confronted. Emphasis is laid upon the differential diagnostic aspects of these complex tachyarrhythmias for today's practicing physicians, since accurate diagnosis is the keystone for a proper approach to management. A didactic approach and departure is assumed in an effort to organize, outline and simplify to the extent possible, a vast, inundating complex field of medicine.
Key Words: Pacemakers: Cardiac Pacing; Tachycardias.

Introduction:

Cardiac pacemaker tachycardias (PT), associated with both single and dual chamber pacemakers, present diagnostic and therapeutic dilemmas and challenges for the practicing physician. PT's associated with atrial sensing/tracking, dual chamber pacemakers swept to the forefront of medicine as the Pacemaker Mediated Tachycardia (PMT) of the Endless Loop Tachycardia (ELT) variety, which although much less frequently observed in modern pacing than with first generation atrial tracking pacemakers, continue to offer diagnostic difficulty among the host of tachycardias to which the pacemaker physician is confronted (1-31).

This work discusses and reviews the many types of tachyarrhythmias associated with cardiac pacemakers, which may present to today's physician.

Definitions:

A. Pacemaker-Induced Tachycardia (PIT) - a tachycardia which is initiated by a pacemaker stimulus, but which does not require further pulse generator participation for maintenance of the tachycardia. Pacemaker activity (the stimulus, spike, artifact S) initiates/provokes the tachyarrhythmia but does not sustain it, since once begun, it is self-sustaining and continues entirely within the patient independently of the pacemaker and without further pacemaker (absent S) activity. Examples: ventricular tachycardia (VT), fibrillation (Vf), atrial fibrillation (Af). PIT's occur in both single and dual chamber pacemakers.

B. PMT - a tachyarrhythmia that requires Pacemaker function for the initiation and maintenance of the tachycardia; it is initiated and sustained by active pacemaker participation. A pacemaker S is present during and throughout the tachycardia.

ELT - a reentry tachycardia (RT) beginning with and sustained by ventricular events which are conducted retrogradely to the atria, via a natural cardiac conduction pathway (retrograde limb), where the retrograde depolarization is sensed by the atrial lead amplifier (sensor), which itself after a delay induces a ventricular output stimulus and depolarization via the Pacemaker (the antegrade limb/artificial "accessory bypass tract"); retrograde atrial depolarization (P') produced by the paced ventricular event maintains the macroreentrant loop. Examples: atrial synchronous pacemaker VDD and DDD ELT's (3-8,10,31).

The Pacemaker Tachycardias

1. Intrinsic.Native Patient Tachycardia.
Unrelated to the cardiac pacemaker; the pulse generator (PG) is inhibited if the patient's intrinsic rate is faster than the preset pacemaker rate; since the tachyarrhythmia is sensed, pacemaker activity is inhibited and is absent on the electrocardiogram (ECG):

R - R interval <Lower Rate Interval (LRI, LR);
< Upper Rate Limit Interval (URLI, UR).

P - R interval <AV Interval/Delay (AVI, PV, AVD).
Figure 1.

2. PIT
Vulnerable Period Tachycardia (VPT), caused by the delivery of a pacemaker S in the vulnerable period (VP) of the ventricular myocardium (near apex of the T wave, the relative refractory period- RP) about 340 ms after the inscription of the q wave of the preceding cycle, as the "R-on-T phenomenon", to induce VT, Vf,

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flutter (VF) or torsade de pointes, or the VP of the atria (about 180-280 ms after the P wave) to produce Af or flutter (AF).

a. Competitive Stimulation. Competitive asynchronous, V00 pacing with the intrinsic rhythm or with extrasystoles (ES), or secondary to pacemaker

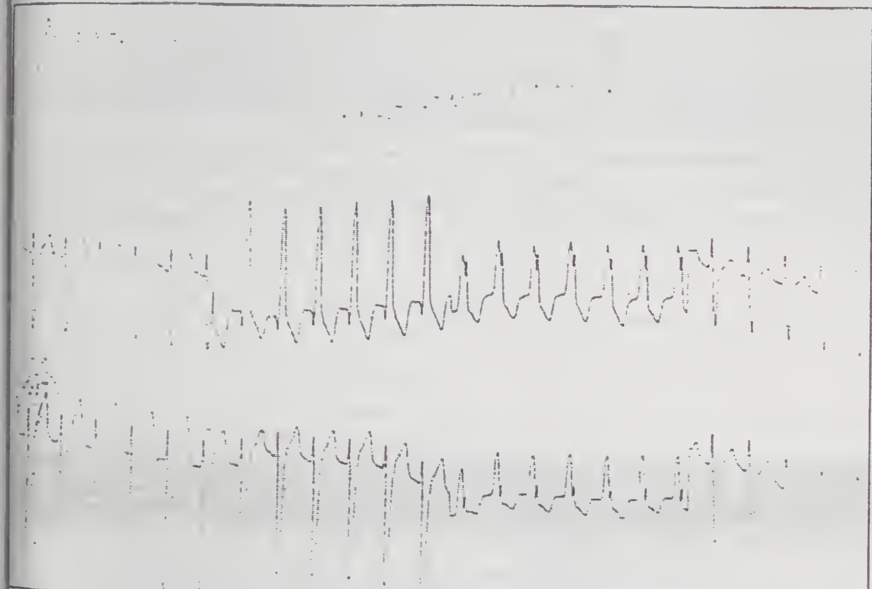


Figure 1. 60 F. RHD. SSS. RBBB, LAH. Intermittent Atrial Flutter with 2:1 conduction, ventricular response 150 bpm. Cordis 233 GR, DDD. Reprogrammed to VVI mode because of misdiagnosis of PMT. LR 70 ppm, VRP 300 ms. Pacemaker inhibited, no spikes are present.

malfunction - failure of ventricular QRS sensing/ defective demand function of VAT, VVI, DVI, AV equential bifocal demand, VDD and DDD units. These achycardias are favored by increased ulnerability and excitability and a ecreased fibrillatory threshold of acute nyocardial ischemia, electrolyte imbaance, acidosis/alkalosis, hypoxemia, utonomic imbalance of catecholamine and agal stimulation, drug excesses (digitalis, uinidine, procainamide, anesthetics), the ong QT Syndrome, a high-output impulse, nd usually with anodal current and ipolar stimulation (1-3,7,16,23,24,30,32-5). This complication has been particularly nked with acute myocardial infarctions AMI), especially right ventricular nfarction which is being paced by a emporary lead in the RV apex, pacing into he ischemic-infarcted area where failure to sense the mall QRS signals may exist; RT's (VT, Vf, torsade) nd even death could result. Repetitive episodes of Vf ere caused by a fixed-rate pacer during VT; a VVI acer which fails to sense a spontaneous QRS complex r an early reciprocal beat (RB). Temporary ndovenous/endocardial bipolar pacing in this ontext may produce VT, Vf and SVT's. These have een especially frequent in the presence of acute (first 4 hours) inferior and RV myocardial infarctions, and have been attributed to catheter manipulation, damaged conduction tissue around the catheter tip and irritable RV myocardium.

Ventricular arrhythmias with the same morphologies as the paced beats, suggest myocardial penetration by the lead electrode. Ridgeway in 1985 (36), found less than 50 reports of induced Vf by permanent pacemakers (1,13,16,23,26,32-47). Figures 2,3,4.

Castellanos, Lemberg and associates made early contributions in this area (48-51). They found pacemaker-induced late systolic repetitive firing (usually a S produces only a single QRS complex) as single or multiple extra beats, VT, VF and Vf from VP S-on-T firing during chronic asynchronous block, AMI and ischemia. Moreover, they found instances of early and late systolic and diastolic repetitive firing after the T wave in patients with AMI and digitalis intoxication, postulated to result from the supernormal period (SNP), a Wedensky effect, two areas of vulnerability, the mechanical effect of the endocardial catheter tip, etc. Repetitive firing was observed after P waves, perhaps due to atrial eddy currents, the P's lowering the excitability threshold of the ventricles, and mechanical factors, as a closer catheter contact between the tip and the endocardium on ventricular contraction. This was also observed with temporary pacers (51,52). Figure 5-A,B.

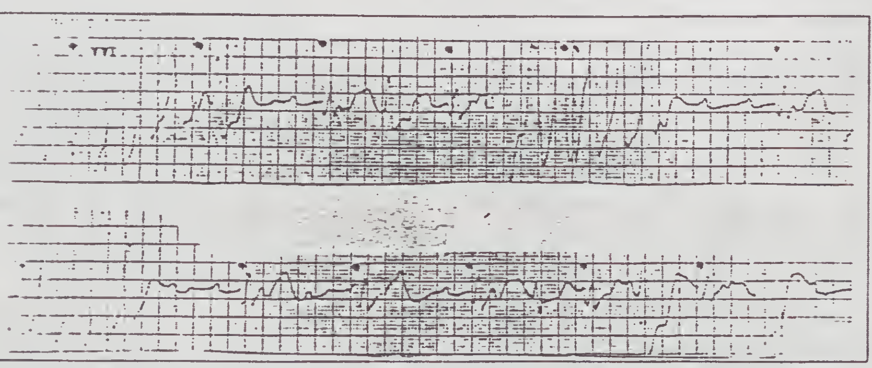


Figure 2. VVI pacemaker. Pacing S's denoted by dots. Pacemaker failure to sense ventricle and pacing at a rate of 45 ppm. Salvos of VT, whose relationship to the pacemaker is uncertain. The isolated "VPB's" and the first beat of the salvos might represent sinus impulses conducted in the SNP, inducing the VT.

Recently, pacemaker-induced VT and Vf were reported as a result of normally functioning VVI pacers with correctly timed stimulation late in diastole after the T wave at the appropriate escape interval (EI), 4-19 years after MI. The induced VT morphology (left bundle branch block-LBBB and marked left axis deviation-LAD) was similar to that of the patient's spontaneous VT (53). Figures 6,7.

b. Asynchronous, competitive atrial pacing can induce Af or AF. Furman & Cooper (54) reported cases of DVI

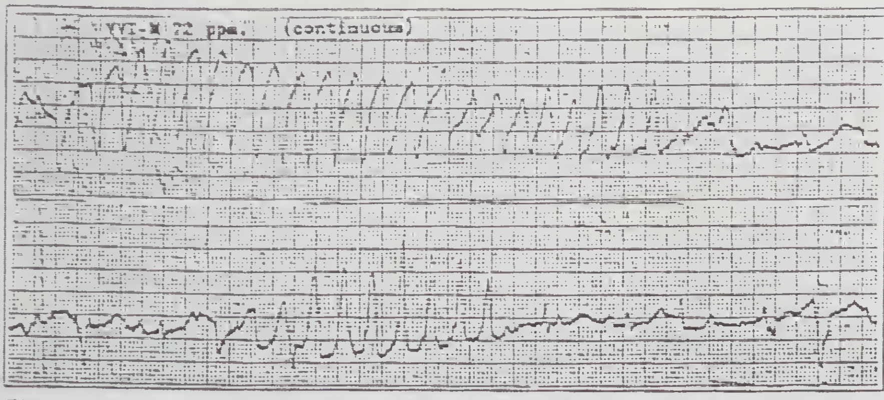


Figure 3. ASHD, COPD. CHF. K 3.3 meq/ L. Complete A V block. Quantum 253, VVI-M Intermedics. Bronchopneumonia. Died. Malfunction. 72 ppm. Probable sensing failure and a VP PIT, or an unrelated Repetitive VT/Torsade de pointe. (Courtesy: Dr. Juan González, Bayamón).

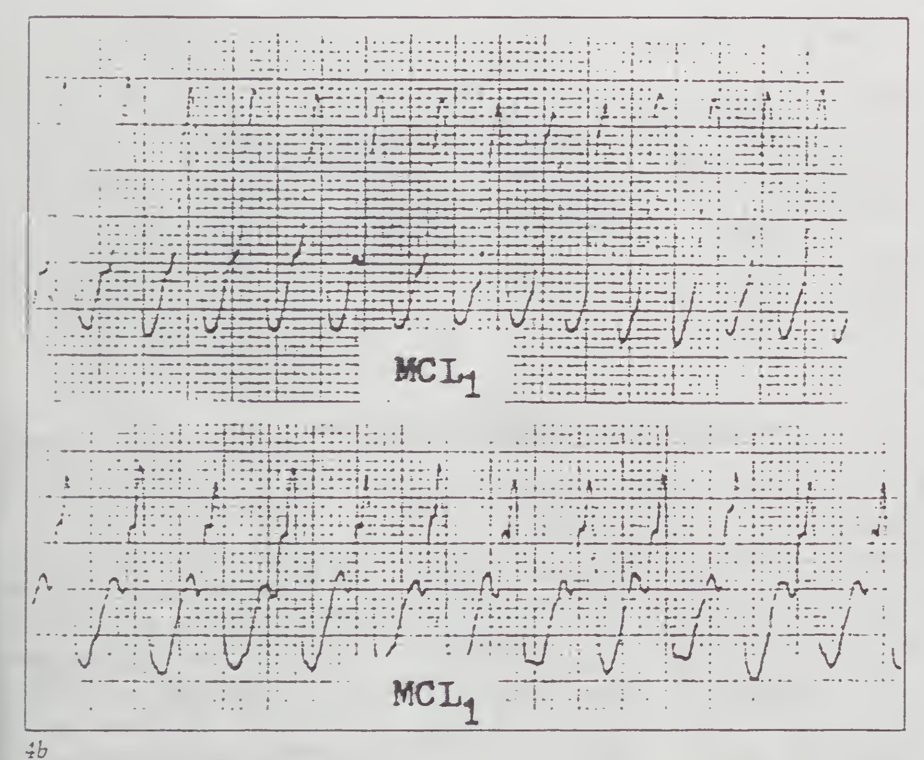
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DDD . 60/160/125.

Lead II

Lead II.

4a



4b

Figure 4. Old & acute MIs, CHF, pericarditis, shock, death. Advanced A V blocks RBBB, A V dissociation. Medtronic Versatrax 7000 DDD, epicardial. PVARP 155 ms. A. Failure of ventricular sensing except for VPB's. APBs, Af/AF. Competition as fixed-rate pacing; A fell on T, V on QRS, ST, T waves with R-on-T. Entrance block. B. VT/VF x 30. Onset of tachycardia not available to prove S-on-T, VP PIT.

(does not sense atria) pacing inducing A (vide infra). The A stimulus was delivered during the atrial VP, which in the human extends from 180-280 ms after the onset of the P wave. VPT's have been observed in both single and dual chamber pacing systems (55,56). Figure 8.

Competitive ventricular pacing may occur in the initial two days after implantation of pacemaker electrodes, and a similar state might follow cardiopulmonary bypass surgery (42).

Thus, vulnerability-related arrhythmias with propagated responses which are usually associated with the peak of the T wave, can be produced by stimuli falling earlier in the cycle within the QRS complex (the corresponding ventricular complex appears after a prolonged S-QRS interval as latency), and later in the diastolic period of the cycle. A pacing stimulus falling well after the peak of the T wave, in the magnetic VOO mode, may cause a burst of repetitive tachycardia. It has been shown that ventricular vulnerability during acute myocardial ischemia and infarction may extend throughout most of the cardiac cycle and is not necessarily confined to the QT interval. This mechanism could explain how both early and late VE's initiate VT and Vf (26,30).

The SNP of Excitability principle has also been put-forward to explain pacemaker-induced propagated responses and tachyarrhythmias. Paced high-energy outputs can lead to repetitive ventricular beating (30).

3. Extrasystoles.

Tip Extrasystoles - endocardial electrode, in the first 24-48 hours post implant, contour similar to that of the paced beats and so they arise from the same site; transient and usually resolve spontaneously. Repetitive phenomena, VT and Vf may be due to stimuli falling within ventricular diastole, secondary to mechanical stimulation of the catheter tip motion as endocardial irritation or the mechanical thrust of the wedged electrode following atrial or ventricular systole. These Tip ES's are not preceded by a pacemaker S, and they may be interpolated between paced beats. One such case without spikes resulted from a temporary wire in the RV apex as repetitive spontaneous depolarization of an ectopic focus, from stimulation beyond the VP of repolarization; the VT remained when the pacer was shut off (1,7,52). Figure 5.A B.

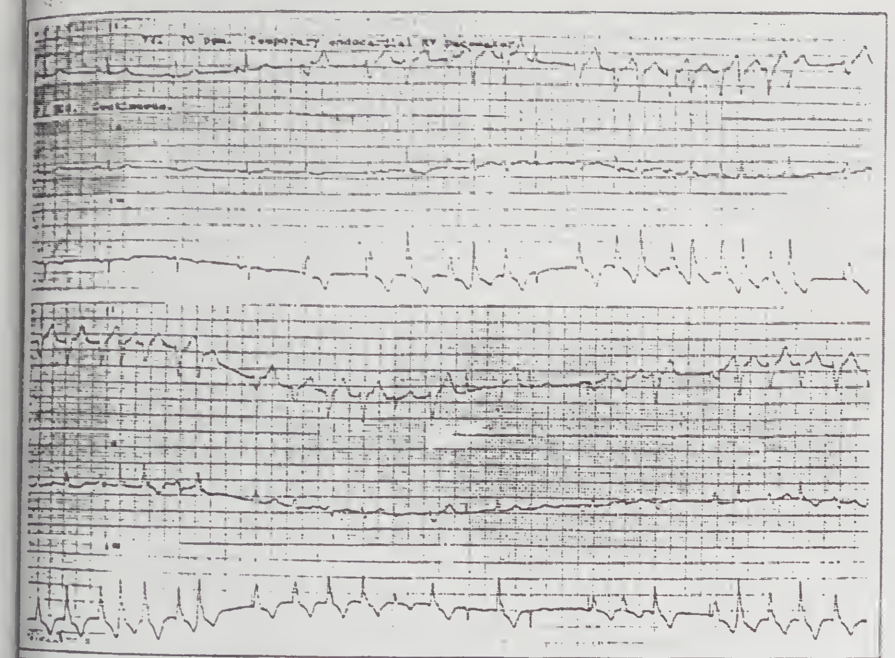


Figure 5a. Symptomatic sinus bradycardia. VVI 70 ppm. Intermittent failure of pacing and sensing, sometimes with pacing of atria. PIT. VVI-induced repetitive late beating, Tip Extrasystoles, VT, Wedensky effect, mechanical factors, hi-intensity S's, etc.

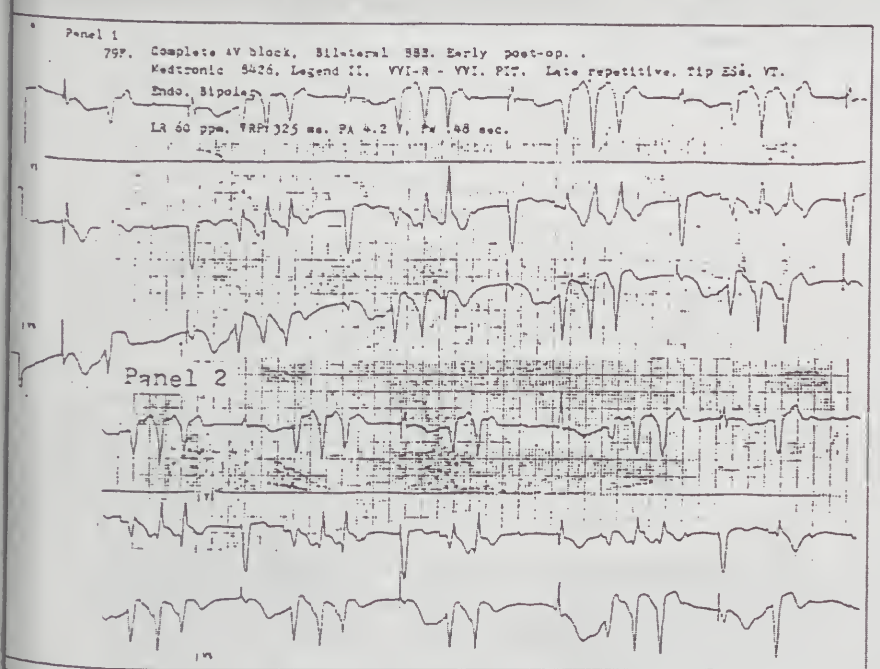


Figure 5b. 79F. Complete AV block, Bilateral BBB. PIT VVI-induced late repetitive beating, Tip Extrasystoles, VT.

. a. VVI pacers can induce ES's, often bigeminal, and hort paroxysms of VT with stable coupling interval o the preceding paced complex and retrograde atrial lepolarization (negative P' waves in leads II, III, aVF), vhich can last for years but which disappear after the G is turned-off. This may represent a reciprocal nechanism (conditioned by retrograde atrial ctivation), and be related to a zone of enhanced ensitivity and electrical instability near the electrode. etrograde atrial activation is common with entricular pacing, especially in the presence of the Sick Sinus Syndrome (SSS) and intact AV conduction. The ES's may be closely related to P waves; Wedensky facilitation and Supernormality may also play roles. These may simulate or represent paroxysms of VT, but only the initial complex is accompanied by a pacemaker S (1,57). Figure 5.

b. Slow ventricular pacing at physiological rates has produced VT (58).

c. A VVI pacemaker implanted to treat a VT actually caused a second VT (59).

d. VT and Vf resulted from two functioning implanted pacemakers, due to VP interaction between the two units, especially during the presence of myocardial hypoxia. Gross irregularity occurred in the ECG (60).

e. A temporary ventricular pacer placed for permanent ventricular pacemaker failure, caused Torsade de Pointes, as the temporary unit failed to sense the permanent unit and its S fell on the T wave of the permanent unit (61).

5. Magnet or Programmer-Induction of Tachyarrhythmias.

Magnet application over a PG disables/inactivates atrial and ventricular sensing producing asynchronous, fixed-rate, competitive pacing. This can provoke life-threatening atrial and ventricular tachyarrhythmias.

a. VVI - VOO - improper magnet application, when the S fell on the T wave following an asynchronous pacer stimulus.

b. Staller (62) VVI - VOO - retrograde VA conduction (VAC) via the AV node in the VP of atrial repolarization, caused Af; a macro-reentry mechanism was postulated.

c. DVI - D00 - SVT's (AP, AV RT's).

d. VDD - V00; DDD - D00 - caused sustained AF via atrial competition on removal of the magnet, when F or P' waves were sensed by the atrial amplifier, inducing an irregular PMT; VDD - resulted in a RT (3,4,62,63).

e. VT was induced by pacemaker programming (64).

f. Ex. DDD-M pacemaker programming placed an A stimulus in the VP of the atria and induced a SVT.

6. A. Ventricular arrhythmias initiated by RV stimuli falling on the T wave:

a. Vulnerability - related.
b. Vulnerability - related local reentry.
c. Reentry-sustained VT.
d. Bundle-branch reentrant arrhythmia.
e. Reentry in a distant infarct site.

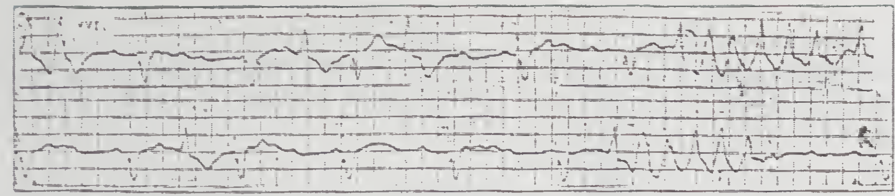


Figure 6. Sinus tachycardia, Long QT-U syndrome. VVI. Intermittent sensing failure, pacing ventricles at 45.5 ppm. Intrinsic VT; or, pacemaker ES's, or sinus capture near SNP inducing VT.

f. Triggered activity due to delayed after-depolarizations initiated at a distant site.

g. Repetitive tachycardias and RT's resulting from a premature beat or paced QRS complex's retrograde conduction to the atria (30,45). Figures 6, 7.

B. SVT's induced by dual-chamber pacemakers:
Af or AF initiated by
a. single atrial beats from DVI pacemakers.
b. burst atrial pacing by DDD, MB pacemaker.

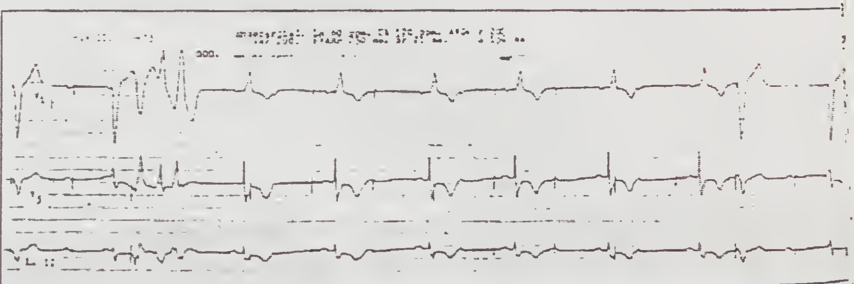


Figure 7. Aortic stenosis. High-grade AV block. LBBB, RBBB, 2:1 AVB. Leads dislodge Absent A spike, one V spike only. Failure to capture and sense ventricle, except for V stimu coming in the SNP of excitability which capture. VP repetitive ventricular beats.

AV Reciprocating Tachycardia (AVRT), Anti-Tachycardia pacing- a. magnet D00 mode; b. DDD, MB burst of atrial stimuli.

7. Weinstock made the first report of SVT produced by routine external transvenous pacing of the RV, without regard to the timing of the stimulus. The S on the end of the T wave captured the ventricle and resulted in delayed VAC to the atria, suggesting reentry as the mechanism, in a patient with SVT (65).

Figure 8. Second Degree AV block. Intermedics 263, cDVI, rate 72 ppm. Competition with sinus P. Af in upper right and lower traces; Sandwich beats. Whether the onset of the Af was due to the A stimulus falling in the atrial VP, is unknown.

8. PIT.
a. Initiation of SVT or Af by a paced ventricular event in patients with the Wolff-Parkinson-White (WPW) syndromes, when the impulse is conducted retrogradely via a concealed or overt accessory pathway (AP) or a fast V-A nodal pathway. The impulse would then reenter the ventricles via the normal slow AV nodal pathway to create paroxysmal SVT or AV nodal RT.
b. Den Dulk's Case 2 (17) was a DDD Pacer progra-mmed as DVI; antegrade conduction the AV node and PG and retrogr conduction via a concealed left-sided a to produce an irregular circus-movem tachycardia (CMT). Waxman's ase 1977, of a complicating SVT, sec concealed AP retrogradely, had alm continuous tachycardia for two yea managed by removal of the PG (6 Harriman's case of a ventricular pac causing SVT utilizing an AP (67). Wehr et al report an incessant irregular with pauses PMT, with one spike, in a patient with the WPW syndrome and normal AV universal pacemaker (Cordis Sequic 233D); the CMT used the pacemaker as the antegrad limb and a septal AP as the retrograde limb (retrograd P' waves). The irregularity was explained by the pacemaker UR fallback response (68). Case 1 of Weber et al had two AP's (69). Case 3 of Weber (VDD) had complete heart block, intermittent AV nodal tachycardia with retrograde atrial activation at the URL, and the pacemaker provided the antegrade limb of the circuit (69).

9. Noise Interference Mode Pacing.
a. Vf was induced by a unipolar VVI pacemaker which had reverted to its noise mode; S-on-T wave, 90 ppm, the pacer's reversion rate (70).
b. Vf has resulted from electrocautery during surgery, and from surgical diathermy (71,72). Moreover, this might result from external electrodes left on the myocardium after cardiac operations.
c. Synchronous atrial pacers under external noises such as 60 cycle interference (electric razor) could produce pacing at the maximal rate. Synchronous pacing during exercise.

10. Repetitive firing, based upon the Wedensky Effect, Supernormality, or the SNP of Excitability when a S of a malfunctioning pacer falls within this period (failure of sensing) (1,30,48-51). Figure 6, 7.

11. Bradycardia-dependent VT facilitated by long

stolic pauses caused by myopotential inhibition of VI pacemaker; the bradycardia dependent VT was cessfully treated by a temporary VVI unit set at a er rate (73).

Myopotential Oversensing -asynchronous opera- could result in competitive pacing which could l to repetitive responses. The Interference Rate of ain WI units is augmented to 90 ppm. VVT tracking myopotentials can result in irregular, constantly nging cycles and S-S intervals.

Paired Pacing has caused late systolic repetitive g near peak of the T wave.

Rate Hysteresis
f associated with rate hysteresis pacemakers. The g pause predisposed to ventricular irritability and olonged QT interval; serious arrhythmias can result. A VPB falling in the VP of a long QT interval duced repeated episodes of Vf (74).
VVI pacer with rate hysteresis plus quinidine, uced episodes of nonsustained, polymorphous VT, gered by each fixed paced beat after the longer teresis EI (75).

VVI pacing in patients with the SSS favors the elopment of Af (76). The incidence of new Af in 2 s is 20-30%, five times the incidence with atrial ng.

Runaway Pacemaker
pacemaker emergency of "Runaway Pacemaker", ying a 50% mortality, is rare in modern pacing. It been observed in both permanent and temporary, in both ventricular and atrial pacing units. It has lted from pacemaker battery depletion, PG tronic circuitry failure (crystal oscillator, rate stors, defective soldering), therapeutic radiation electrocautery to a DVI pacer with CMOS, and ntaneously. Also defibrillation damage to pace- er circuitry has led to runaway. Pacing rates as as 120 ppm, up to 1500, 2400 and 6000 ppm have observed. ECG's may show capture, intermittent tic capture or no effective capture at all (the ntaneous rhythm prevails) in a regular or irregular ern, because of the rapid, low intensity output uli. The tachycardia usually starts suddenly. It cause VE's, VT, Vf, hypotension and sudden ut failure from rapid depletion of the battery age. Radioauscultation may be of diagnostic aid.
erential diagnosis:
tifacts - a loose monitoring electrode, 500 impul- sec, noise, AC current artifact 60 cps, 50 cps, other rference;
pontaneous VT, Vf;
Spontaneous wide QRS tachycardia in VVT pacing lls within each sensed QRS complex rather than e onset);

d. tracking of Af, AF. VVT and AAT pacemaker tracking a native tachycardia, in which a magnet results in cessation of sensing of spontaneous cardiac activity. Magnet application has no effect on a pacemaker runaway tachycardia. (3,13,34,77-81). Figures 9, 10.

17. AV Sequential DVI Pacemakers.
a. Uncommitted/partially committed DVI - an increased atrial pacing rate when spontaneous ventricular activity is sensed before completion of the AVI (4).
b. VPT's - atrial and ventricular tachyarrhythmias; Af, AF from asynchronous atrial pacing (2 b above).
c. Retrograde conduction from ventricular pacing.
d. DVI Runaway, after radiation (77,81).
e. DVI failure of atrial capture can cause tachyarrhythmias.
f. Magnet - Af, AF and atrial tachycardia (AT), from the asynchronous competitive atrial pacing.
g. DVI-induced Af or other atrial arrhythmia if an intense unipolar, cathodal A stimulus falls within the atrial VP (about 240 ms after the P wave), since there is no atrial sensing in the DVI mode and competition between the unsensed P wave and the A stimulus (54). Figure 8,
h. DDX mode - an A stimulus falling close to the unsensed P of the DVI mode may fall within the atrial myocardial RP (AMRP) and not result in atrial capture; this sequence favors rVAC and a PT.
i. Normal Bifocal Demand pacing plus a junctional rhythm (falsely induced); the A closely preceded the

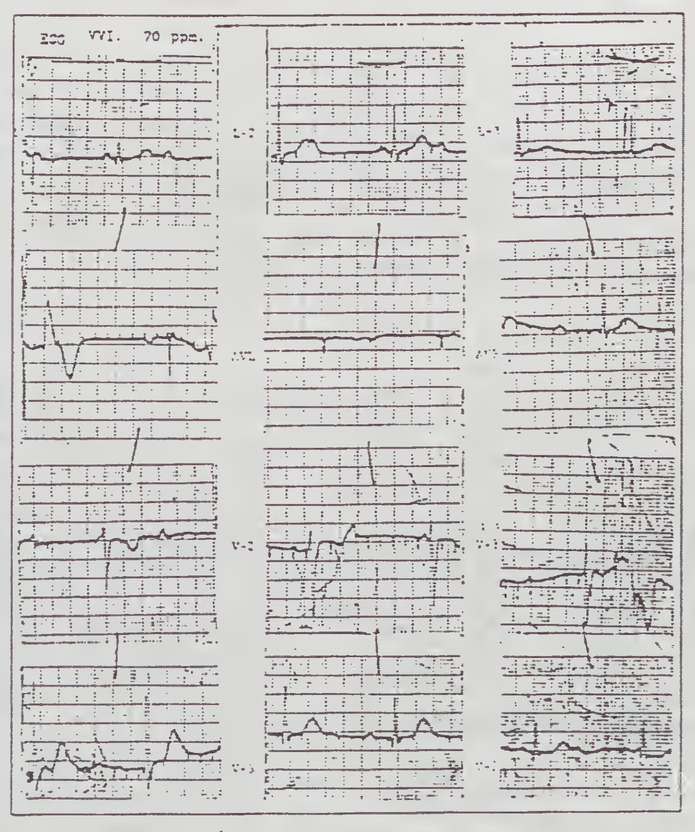


Figure 9. Congenital complete AV block. VVI, mercury-zinc battery. Runaway Pacemaker, without ventricular capture. S rate 454 ppm.

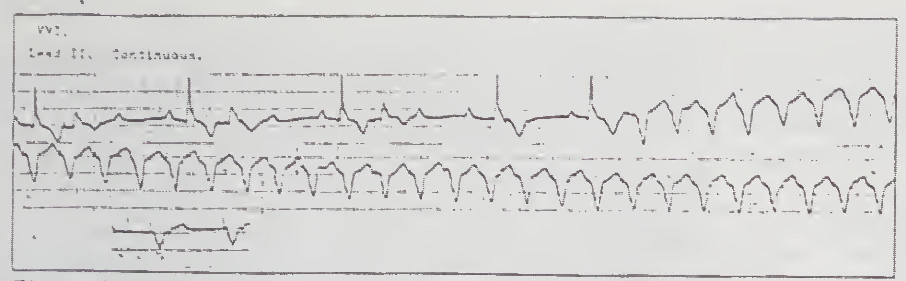


Figure 10. Congenital AV block. Syncope, chest pain. VVI. Runaway PG, rate 140 ppm, sometimes with ventricular capture. Sometimes 2:1 VAC (end of lower strip). ? VE's or slow, accentuated U waves, follow the first three beats.

QRS complex and there was no V; the patient's own R-R interval was only slightly longer than the Atrial Escape Interval (AEI) (82). A bifocal demand pacer with normal function caused a SVT (83).

j. A normal committed DVI (cDVI) pacemaker (Intermedics Cyberlith IV 259-01) has very rarely caused a repetitive response, uniform or polymorphous fatal VT/Vf, when the asynchronous V fell in the VP of ventricular repolarization, since there is no ventricular sensing during the AVI (in uncommitted DVI, uDVI, pacers ventricular sensing occurs throughout the AVI). This situation might prevail when a VE not sensed by the ventricular electrode, or an A stimulus occurring late in the terminal portion of a wide QRS complex/ VPB (pseudopseudo-fusion beat, late sensing), especially with a long coupling interval, a short QT interval or augmented vulnerability, or a LV-VPB, occurring in the Blanking Period (BP) when it is unsensed - resulting in the committed V stimulus falling in the VP (beginning of the ST segment or on top of the T wave, or the terminal portion of the QRS complex)-asynchronous stimulation in the ventricle may occur when a VPB comes immediately before atrial stimulation followed by a committed V spike, since the ventricular sensing mechanism is disabled after the A stimulus. Non-committed DVI units have a shorter BP after the A spike. One fatal case. (4,13,19,84,85) Figure 11.

k. DVI mode pacing-induced PMT by myopotential sensing (vide infra) (86).

18. VDD Pacing

a. A slow sinus rate less than the LR (escape rate faster than the sinus rate) with effective VVI pacing with AV dissociation, causing retrograde VAC, can provoke a ventricular RT if the V occurs shortly after termination of the URI, falling in the VP of the previous beat.

b. Recurrent VT - atrial synchronized atrial premature beat (APB) and a pacemaker EB.

c. Freedman et al described recurrent VT induced by the Pacemaker.

d. Myopotentials can lead to VT and AV dissociation. (4,28,42,87-90).

19. DDD and VDD Pacing.

a. A PIT VPT caused by delivery of a stimulus in the VP of the ventricle to caus VT, Vf and repetitive firing, or in the atriu to cause Af (4).

b. Failure of atrial capture with retained sensing can allow the *sensing* of an earl displaced or retrograde P' wave followin the V paced beat occurring on the T wave especially after a short Post Ventricula ARP (PVARP) ; the V is emitted and fall during the VP producing repetitiv ventricular firing without a S, or an episode of VT (4,9,42,91).

c. Normal pacemaker function or an unsensed P wave can result in atrial stimulation at the end or within a QRS complex, especially if wide, as a PPFB, or late sensing of a VPB, plus the ventricular beat falling undetected within a long BP (BP undersensing of the QRS) plus a long AVD, can result in the V stimulus being delivered near the apex of the T wave (4,19,84,85,92).

d. DDD - P wave undersensing, plus a long AVI can result in delivery of a V stimulus in the VP (4).

e. An ARP shorter than the ventricular RF (VRP) with *sensing* of a VPB in the atria, or Far-field *sensing* in the atria of a VPB not sensed by the ventricular channel, especially with high atrial and low ventricular sensitivity, may result in the delivery of a V stimulus after the AVI in the VP (4).

f. Sensing of an early APB or myopotential oversensing plus a short PVARP and a short URLI can trigger stimulation near the T wave (4).

g. Dissociated atrial and ventricular events, a short PVARP with sensing of an early P' wave, could result in V delivery near the T apex (4); a long VRP - a VPB with rP' beyond the PVARP could trigger a V stimulus within the T wave of the unsensed VPB.

h. PIT - Burst atrial pacing by DDD, MB pacer. Magnet - DOO atrial paced beats might lead to an AV reciprocal tachycardia (30).

i. Atrial lead sensing of a ventricular event (farfield

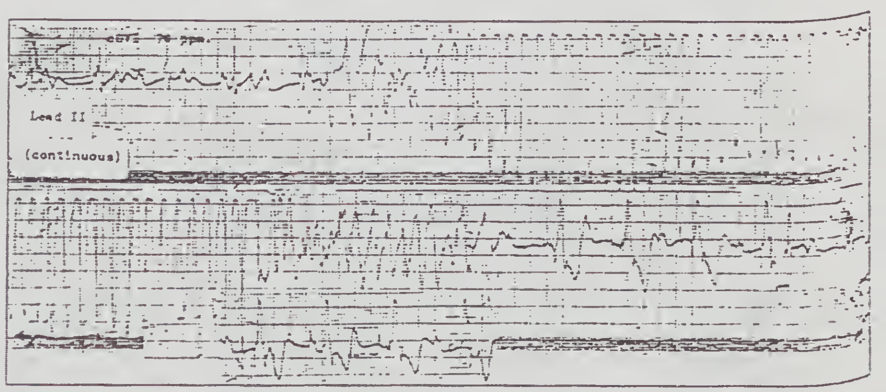
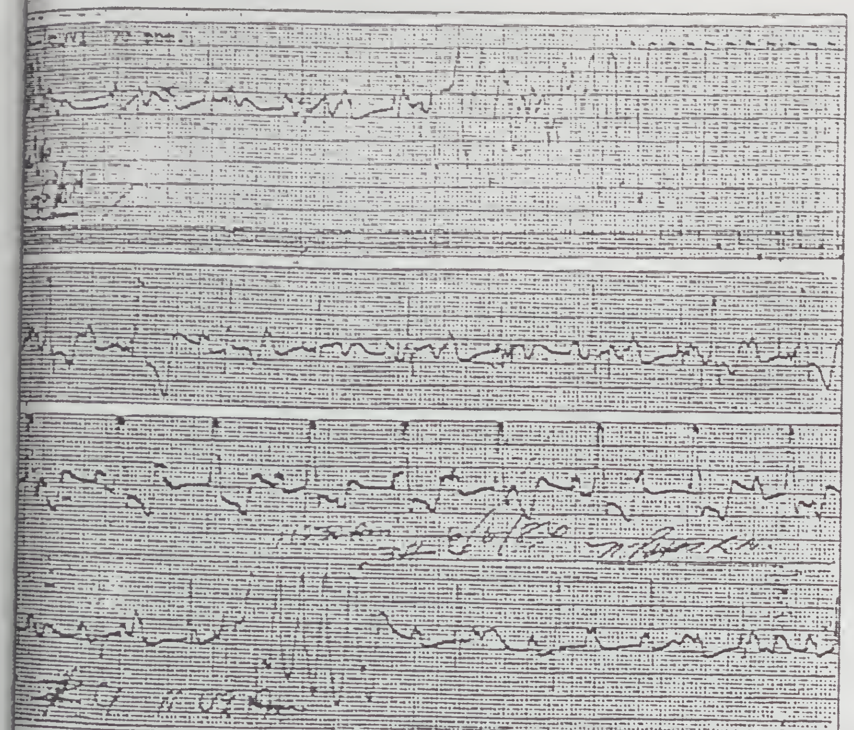


Figure 11. Second-degree AV block. Intermedics 263, cDVI, rate 70 ppm. A. Competition with sinus P. Ventricular sensing failure. The A & V stimuli fall after the QRS complex, or the A stimulus fall at the end of the QRS complex as a pseudopseudofusion beat. The V stimulus falls in the VP of the T wave of the native beat, to induce Vf, etc. (Courtesy: Dr. Juan Gonz... Bayamón).



re11B. *In the penultimate beat, second row, the V stimulus captures the ventricle once.*

sing) when the VRP> PVARP, initiating an AVI
n delivery of a V stimulus on the T wave of the
nt/VPB.

Dual Chamber pacemakers, including DDD units. ntricular BP. A 12-60 ms period of ventricular sensing after atrial stimulation designed to avoid tricular self-inhibition by the atrial put (crosstalk). A VPB occurring within BP is not sensed and the ventricular nnel is not inhibited. After the grammed AVD there would be emitted asynchronous V stimulus during the of the preceding VPB or QRS complex, ch could initiate VT or Vf (4,7,92).

A DDD-M pacemaker (Medtronic satrax) programmed to the DVI mode voked a Myopotential PT, rate 150 n, explained by the UR mechanism being fully functional, although not ble in the DVI mode; the tachycardia sustained only if the VAI was shorter n the URI (86).

The Siemens 664, DDD unit was prone igh rate pacing at implant when the leads were first connected without tact between the pacer case and the ent; when the PG was placed in the ket this was terminated (13).

Early premature beats occurring in a eminal pattern can produce a tachy-

cardia at double the pacing rate with every second beat paced, when each paced beat falls in the RP of the pacemaker and are not sensed and do not recycle the pacemaker (48,93).

24. An Interpolated Tachycardia - tachycardia due to interpolated paced beats from a fixed rate pacer (sinus and paced rhythms) or in a failing demand unit.

25. Two pacemakers competing with each other may result in a tachycardiac rate. Competition between a demand pacemaker and a fixed-rate pacemaker induced a tachycardia (94). Figure 12.

26. A DDD pacer caused a type of ventricular Pseudobigeminy mild tachy cardia in a patient with atrial tachycardia, by 1:3 tracking of the pacemaker (95).

27. a. Tracking of ventricular tachyarrhythmias by ventricular triggered (VVT) pacemakers.
b. Tracking of atrial tachyarrhythmias by atrial triggered (AAT) pacers.
c. Tachycardias from a Triggered QRS, P Synchronous demand pacemaker, as the pacemaker tracks/ synchronizes with an intrinsic tachycardia, up to the maximal synchronizing rate as permitted by the pacemaker RP. d. Synchronized repetitive firing in

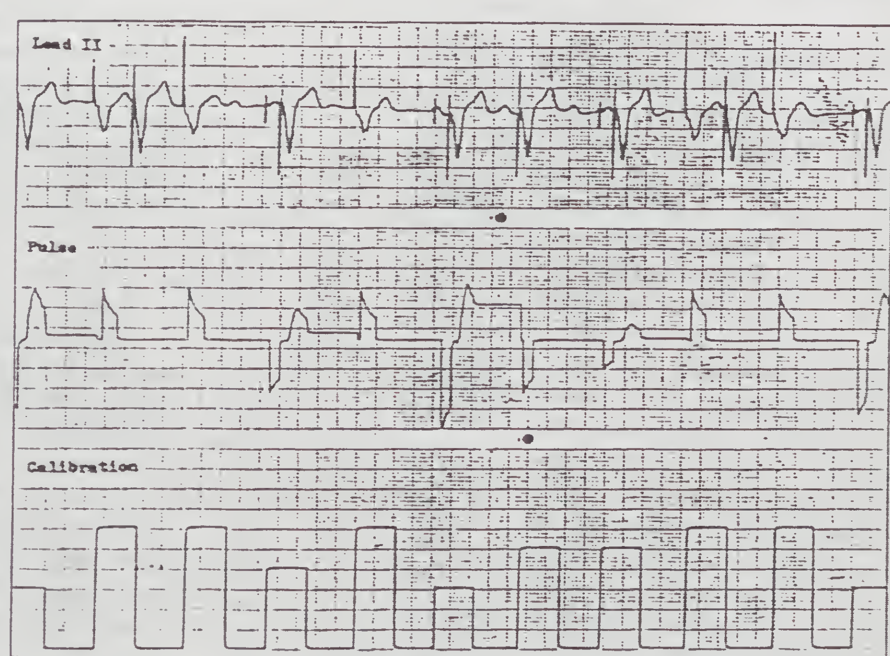


Figure 12. AsHD. 2:1 & complete A V block. Two pacemakerst Intermedics 233 VVI (1980), unipolar epicardial, LR 71 ppm; in 1984 a new unipolar endocardial Medtronic 7000A DDD with LR 60, UR 150, AVI 150, AEI 850 ms, PVARP 155 ms. The old VVI unit is now pacing the ventricles at rate 65 ppm and has a large positive S & pulse; it fails to sense the paced ventricular beat of the new DDD unit. The new DDD unit captures the atria and ventricles and has a disphasic V spike and negative pulse; it tracks a ? P impulse within the previous old VVI paced beat at the UR (400 ms), to produce triplet groups at a tachycardia rate.

SVT; sinus tachycardia (ST) with T wave sensing and synchronization (1,43,48,96-99).

28. A Teletronics ventricular triggered P6, bipolar pacemaker caused a paced rate of 130 ppm as false triggering due to a small distance between the electrodes or depolarization after-potentials (100).

29. Overdrive atrial pacing, and chest wall stimulation (CWS) can augment the ventricular rate (4,5).

Resumen: Este trabajo discute y repasa los muchos tipos de tachycardias asociadas a marcapasos cardíacos a las cuales el médico contemporáneo podría enfrentarse. Debido a que un diagnóstico certero es la llave para un manejo apropiado, énfasis va a ser puesto en el diagnóstico diferencial de estas complejas tachyarrhytmias. Un acercamiento y punto de partida didáctico es asumido en un esfuerzo para organizar y simplificar en la medida posible esta parte del vasto y complejo campo de la medicina.

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PRIMERA JORNADA SOBRE SIDA

Asociación Médica de Puerto Rico

PREVENIR ES VIVIR

26 de marzo de 1994

Hotel San Juan • Isla Verde, Puerto Rico

PROGRAMA

7:30 am - 8:30 am .... Registro

8:30 am - 9:30 am .... Epidemiología del SIDA y Proyecciones Estadísticas de la Enfermedad.
Johnny Rullán, M.D. M.P.H; Director Epidemiología, OCASET

9:30 am -10:30 am .... Actualización de Conceptos sobre el SIDA: Etiología, Mecanismos de transmisión, diagnóstico, medios de prevención.
Dr. Carlos Ramírez Ronda, Jefe Departamento de Medicina, Hospital Veteranos, San Juan; Director Enfermedades Infecciosas, Escuela de Medicina U.P.R.

10:30 am-11:30 am .... Enfoques educativos en la prevención del SIDA y el impacto sicosocial: familia, escuela y comunidad.
Srta. Lissette Morales Ramírez, Colegio de Trabajadores Sociales, Trabajadora Social OCASET
Dra. Maricarmen Santos Ortiz, Catedrática Programa de Educación en Salud, Escuela Graduada de Salud Pública, R.C.M
Prof. Daisy Gely Rodríguez, M.P.H.E., Dir. de Educación en SIDA para Profesionales de la Salud, R.C.M.
Prof. Ada M. Alemán Batista, M.P.H.E.; Programa Salud Escolar, Departamento de Educación

11:30 am- 1:00 pm .... Almuerzo

1:00 pm - 2:00 pm .... Panel de Discusión: "Mecanismos tradicionales y no tradicionales de educación y prevención contra el SIDA" por iniciativas comunitarias.
Padre Jorge Ferrer · Dra. Jelitza García, Fundación SIDA
Dr. José Vargas Vidot, Director Ejecutivo Iniciativa Comunitaria de Investigación
Dr. Roberto Unda, Director Educación ISSJ

2:00 pm - 3:00 pm .... Actualización de los aspectos Bio-Psico-Sociales del Paciente VIH+/SIDA.
Dr. Raúl Benítez, Siquiatra; Director Médico, Hosp. Panamericano
Dra. Angie Quintana, Sicóloga; Instituto SIDA de San Juan

3:00 pm - 4:00 pm .... Impacto Económico de la epidemia del SIDA en Puerto Rico y los Estados Unidos.
Dr. José Alameda, Prof. Recinto Universitario de Mayagüez · Dr. Joaquín Villamil, Economista

4:00 pm - 5:00 pm .... Implicaciones médico-legales en el discrimen a pacientes VIH+/SIDA.
Ramón Isales, M.D., J.D.; Consejo Etico Judicial, A.M.P.R.

Hoja de Inscripción

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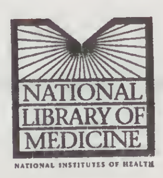
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ASOCIACION MEDICA DE PUERTO RICO

BOLETIN

1902

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Contenido

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ASOCIACION MEDICA DE PUERTO RICO

Editoriales:

El precio de las medicinas

José C. Román De Jesús, M.D.
Ex Presidente AMPR

En el seno de las actividades académicas de la Asociación Médica de Puerto Rico y de las seccionales de distritos y de especialidades, hemos venido escuchando a través del tiempo la queja continua y la preocupación por el precio de las medicinas, de parte de nuestros médicos. Y no es tanto aquel medicamento ocasional para un padecimiento agudo. Es el costo de un fármaco de sostenimiento que el consumidor necesita para controlar una condición, padecimiento o enfermedad, donde la suspensión del mismo acarrea que se agraven unos síntomas y pueda acelerar el desenlace final. Si vemos que esta necesidad se da en mayor frecuencia en el envejeciente y si sabemos las condiciones económicas de la mayoría de este sector poblacional con unos ingresos menguados; a veces sólo un pequeño pago del seguro social federal, estamos hablando de una situación crítica.

Por varios años hemos estado señalando la situación antes explicada, públicamente. Y la primer acción positiva fue la resolución del Senado 650 del 25 de octubre de 1990, cuando al aprobarse, se nombró una Comisión Senatorial, presidida por el propio Presidente de ese alto cuerpo, el Senador Don Miguel Hernández Agosto, con el fin único de investigar el problema del costo de los medicamentos. Tuvimos el privilegio de formar parte del Comité Asesor de esa Comisión. Ahora, se siguen tomando acciones que tienden a aminorar el impacto que hemos descrito. El Secretario del Departamento de Asuntos del Consumidor, DACO, el Lic. Iván Ayala Cádiz, acaba de firmar una orden administrativa, congelando el precio de las medicinas por 30 a 90 días.

Si analizamos el informe de la Comisión Senatorial, informe que recoge los datos suministrados y analizados con la participación de médicos, administradores de facilidades de salud, economistas, farmacéuticos, dueños de farmacia, etc. tenemos que resulta en un documento veraz, descriptivo de la realidad imperante.

Veamos algunos segmentos recogidos de este informe.

Anteriormente se había realizado un estudio que señalaba los costos a nivel de farmacia-consumidor. Pero es interesante saber, según este primer informe, que en el 1986 el índice de aumento en los precios al consumidor fue de 5.5 puntos mayor que el aumento en los costos generales. Los precios variaban de farmacia en farmacia y éstos tenían unas ganancias de 65% en los bioequivalentes y de 32% en los productos de marca. Las ganancias de droguerías las señaló el informe en el marco de 16.6%.

El informe rendido recientemente por la Comisión Senatorial ha sido más abarcador. La investigación se amplió a las casas manufactureras, a las droguerías, a las farmacias y a los consumidores. De él sabemos que entre los años 80 al 89 los gastos en productos médicos subió al 178%; en otros productos, 78%; el primero 19% por año, los segundos 9%. Del año 1987 al 90, estos gastos manifestaron un alza de 23.1%; los otros productos, 12.5%. Si comparamos estos resultados con los que nos da el informe del Senador Pryor en Estados Unidos, en este país el aumento promedió 20% mayor que los otros costos. La inflación general es 0.2% y el de los productos farmacéuticos es de 1.3% (6 1/2 veces mayor). En los Estados Unidos el precio de los medicamentos es 62% mayor que en Canadá y 54% más que en Europa. Sin embargo, es sólo ligeramente más alto que en Puerto Rico.

Es importante señalar que en Puerto Rico existen 84 plantas que elaboran productos farmacéuticos. Estas empresas disfrutan de exención contributiva, incentivos industriales, mano de obra diestra y joven, administradores bien formados, salarios más bajos que Estados Unidos, etc. Vemos por otro lado, que esta industria recibe los beneficios por la Sección 936 del Código de Rentas Internas Federal, lo que significa que en términos de exención recibe $70,788 por empleado, lo que es casi tres veces el salario promedio: $26,000. Por lo que significa que obtiene el 50% de los beneficios de la Sección 936, no obstante aporta sólo del 15 al 18% de los empleos totales generados. En el año 1989 estas empresas pagaron 201 millones de dólares en nómina; obtuvieron beneficios por 4,500 millones de los que 3,100 millones fueron exentos de contribución.

De parte de los consumidores es necesario conocer que el estudio señala al 93% de las familias como usuarios de algún medicamento recetado por un médico o dentista. Los medicamentos de mayor demanda son: antihipertensivos, analgésicos, gastrointestinales, antibióticos y antiinflamatorios. El uso de los mismos aumenta con la edad. El 74% de los consumidores lo obtienen de las farmacias privadas; el 22% de las farmacias gubernamentales y el 0.7% del extranjero. Los consumidores pagaron de sus bolsillos un 55%; 25% a través del plan médico y el 20% lo recibió del gobierno. Es muy importante

conocer que un grupo sustancial de los consumidores descontinuó el tratamiento por razones económicas, con los resultados nefastos que esta situación puede provocar.

Los planes de servicios médico-hospitalarios prepagados exigen una serie de condiciones para otorgar la cubierta de farmacia: que requieran receta médica; de edad menor a los 65 años; se otorga a grupos, no individuos; se controla la cantidad y fijan unos deducibles. Para Cruz Azul este gasto representó dentro del resto del costo de los servicios médico-hospitalarios 38 centavos por cada dólar; para Triple S, 50 centavos por cada dólar (en los empleados del sector gubernamental).

Una salida a este problema sería la utilización máxima de productos bioequivalentes. Con esos fines se aprobó una ley, la número 11, del 12 de junio de 1976, la que permite al farmacéutico sustituir un producto de marca, a su discreción, por uno bioequivalente siempre y cuando la receta del médico no lo objete específicamente. Una gran parte de estos profesionales no hace efectiva la ley. El informe nos dice también que sólo el 35% de los consumidores sabía de que se trata; el 68% de los farmacéuticos lo ofrece.

Es significativo que debido a que las droguerías dan unos descuentos del 9 al 10% a las farmacias, de los que el 75% se acogen; lo que permite que el 85% de estos ofrezcan a sus clientes consecuentes mayormente, los de edad avanzada y los de condiciones crónicas, descuentos de 10%. Esto se traduce en precios menores para los consumidores puertorriqueños comparado con los de Estados Unidos.

De toda la información obtenida se concluye que el 93% de la población pide que se intervenga y se resuelva el problema. El trabajo confirma que el aspecto económico que se manifiesta por el incremento en los costos de los productos farmacéuticos es significativo.

Quienes fijan el precio son los productores de las medicinas no interviniendo la ley económica que "el precio de un producto depende de la oferta y la demanda". Existe un virtual monopolio ya que por la ventaja de la exclusividad de una patente y bajo el pretexto del costo de la investigación, el precio no tiene relación con el mercado. Esto no le deja al consumidor la alternativa de buscar el mejor precio y otros productos semejantes en ese mercado.

Dentro de este informe surgen unas recomendaciones que son resultante de las opiniones obtenidas a saber: se necesitan controles de precio a nivel de la manufactura; las farmacéuticas de Puerto Rico deben vender directamente en este mercado; debe incentivarse el uso de bioequivalentes, incluyendo al médico, al consumidor y al farmacéutico en ese aspecto; asesorar a los consumidores en el uso exagerado de medicamentos; fiscalizar las prácticas de mercado en contra de la libre competencia; estudiar las leyes que rigen el comercio interestatal; persuadir a los productores en una reducción en los precios basándose en los beneficios de las 936, etc.

Resumiendo, esta investigación nos ha dejado una información muy valiosa que ha de dirigirse a la solución de este grave problema, que requiere medidas de justicia social para nuestra población más dependientes de estos medicamentos: los envejecientes. Es cuestión de responsabilidad ciudadana y de cumplir el compromiso que tenemos de servir a nuestro pueblo. Es así que ha de orquestarse la acción conjunta de las manufactureras, los médicos, las farmacias y las droguerías, así como los farmacéuticos. Sólo así estaremos cumpliendo con los retos presentes, que serán historia mañana.

Artículos Originales:

Relationship of Heterozygous Alpha-One-Antitrysin Phenotypes, Smoking and Emphysema in Puerto Ricans

Charlotte Colp, M.D.*, Eugene A. Gatti, M.D.**, and Jack Lieberman, M.D.***

Summary: We have previously reported that the S and Z variant phenotypes of alpha-1-antitrypsin (AAT) are common in Puerto Ricans in New York City and are frequently associated with bronchial asthma, which has a high prevalence in that population.

A random sampling of 82 Puerto Rican (PR) patients at Beth Israel Medical Center with asthma and/or COPD indicated 65 with PiM phenotype and 17 with MS, MZ, or SZ variant phenotypes. All of the latter gave a family history of asthma in a first degree relative, and only one was a smoker, differing significantly from the PiM patients in these two parameters. The variant phenotype patients also tended to differ from the PiM group in several other parameters reflecting diagnosis of asthma rather than COPD. More were females, of younger age, and with higher IgE and blood eosinophil counts; only one of 17 variant patients had evidence of emphysema by chest X ray, and none by Carbon Monoxide Diffusing Capacity, as compared to 14% of the PiM patients.

In contrast a patient is presented who was referred to us from New Jersey with SZ phenotype and serum AAT of 80 mg. % who had lifetime asthma but became a heavy smoker and developed severe emphysema at a relatively young age.

We suggest that the S and Z heterozygous AAT phenotypes tend to prevent PR patients from smoking (presumably due to bronchospasm) and thereby diminish their risk of emphysema.

Introdution

Alpha-1-antitrypsin (AAT) is the major serum antiprotease whose relationship to the pathogenesis of lung disease is well known. Of the more than 70 variants observed, the most common or normal type of AAT is designated as an MM phenotype. AAT is inherited by two autosomal codominant genes. The homozygous ZZ phenotype is associated with severe reduction of serum AAT concentration and commonly leads to emphysema. The heterozygous MZ phenotype, with an intermediate deficiency of AAT may also predispose to emphysema, especially in smokers who have an excess of proteolytic enzymes in the lung (1). In addition, several authors have noted an increased prevalence of asthma and bronchohyperreactivity in individuals with variant AAT phenotypes, especially the S trait (2,3).

We previously reported an increased prevalence of chronic bronchospastic disease in patients of Puerto Rican descent in New York City, possibly related to the variant AAT phenotypes commonly present in that ethnic group (4,5). We noted a striking avoidance of smoking in those subjects with S and Z variants of AAT, presumably because of lifelong bronchial hyperirritability (4). A clear exception is a patient described in detail below with moderately severe AAT deficiency due to an SZ phenotype who smoked heavily in spite of childhood asthma and who developed extensive emphysema.

In order to further explore the relationship between AAT, smoking, and lung disease, we now report upon AAT studies in 82 adult patients with obstructive airway disease and/or asthma.

Methods

All patients identified themselves as being of Puerto Rican descent through both parents. With the exception of the reference case RCH, who resides in New Jersey, all patients were randomly chosen from those presenting at the outpatient service of Beth Israel Medical Center in New York City with diagnoses of asthma and/or COPD. Pulmonary function studies and serum eosinophil count and

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Supported by the Singer Grant Award of the Beth Israel Medical Center, the Medical Research Service of the Veterans Affairs, and the Neil Simon Charitable Directed Fund.
Reprint requests to: Charlotte Colp, M.D. Ambulatory Medical Service, Beth Israel Med. Center, First Ave. at 16th Street, New York, N. Y. 10003

immunoglobin E were performed as previously noted (4). Forced expired volume in one second (FEV1) was determined at each patient clinic visit, and in the Pulmonary Laboratory before and after bronchodilator. The result reported is the mean value of multiple visits. The FEV1 Lability Index is defined as the highest value ever obtained for the patient (with or without bronchodilator) minus the lowest, divided by the mean.

Serum specimens were sent to Sepulveda, California for AAT quantitation and phenotyping (5). AAT concentration was determined by radial immunodiffusion and AAT phenotyping by isoelectric focusing at pH 4.0 to 5.0. Statistical calculations were performed by Chi square and Student's t test. $P < .05$ was considered statistically significant.

Case Report

CRH is a 49 year old female of Puerto Rican descent who lived in New York City during her childhood, but moved to suburban Philadelphia 10 years ago. In childhood she had frequent respiratory illnesses with wheezing, exacerbated by infections, cold air, exercise, and allergies to dusts and animals. Diagnoses of both asthma and pneumonia were made. Her symptoms improved somewhat with adolescence allowing her to smoke 2 packs of cigarettes daily from ages 15-48. She noted bronchial irritation from passive (second hand) smoking but not active smoking.

The patient carried three pregnancies without difficulty, but noted shortness of breath during her fourth pregnancy. In 1985 she was hospitalized for pneumonia, which she was told led to the development of emphysema. Since that time she has become progressively more disabled with severe chronic shortness of breath, in spite of almost continuous use of oral and inhaled corticosteroid therapy and bronchodilators.

Physical examination of the patient showed only diminished breath sounds without audible wheeze or rhonchi.

X ray films of the chest: Poor quality copy films were available for 1973, 1974, and 1985, showing bilateral upper lobe hyperlucency with diminished vascular markings, suggesting emphysema. In addition, the film of 1985 shows a left upper lobe infiltate.More recent films of 1992 show more clearcut bilatera upper lobe emphysema as well as lower lobe emphysema (Figs 1-3).

Pulmonary function studies in 1987 and 1991 (see Table 1) showed findings indicative of emphysema with severe airway obstruction, pulmonary hyperinflation with increase of residual volume and total lung capacity, and marked reduction of carbon monoxide diffusing capacity. However, there was significant improvement of spirometry with



Figures 1 and 2: Chest PA and Lateral Xrays of 1992 of patient CRH, showing marked hyperinflation with low, flattened diaphragms and widened anterior interspaces.

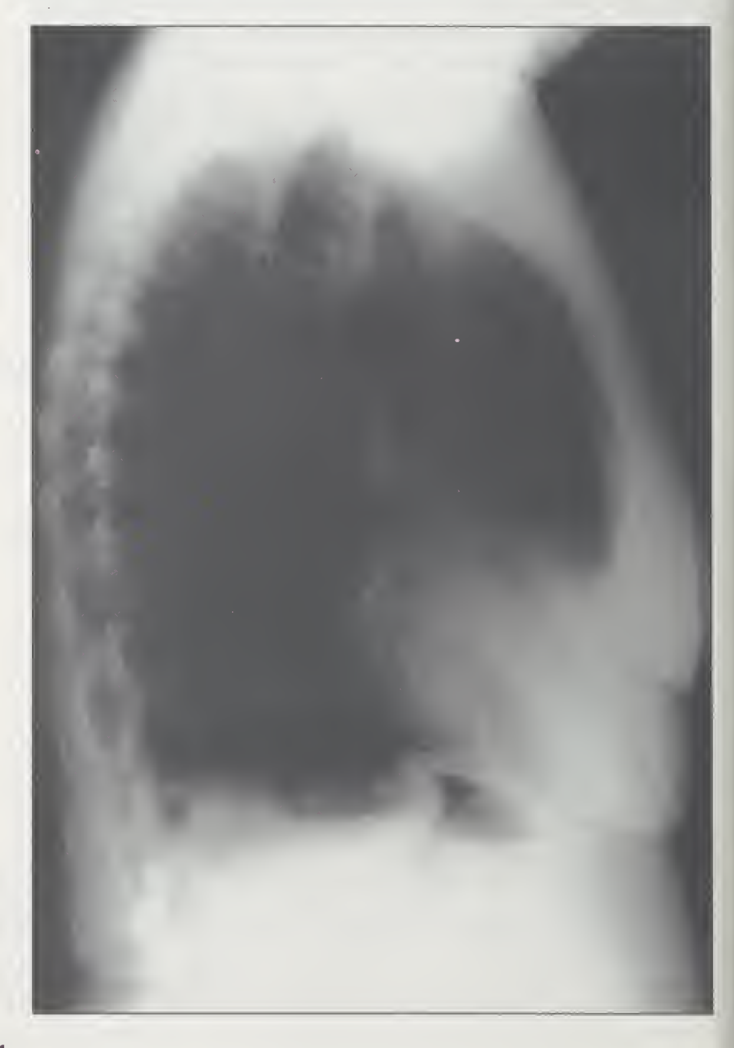




Figure 3: Chest CT cut at the level of the thoracic aortic arch indicative of emphysema with decreased lung vascular markings.

Table 1
Pulmonary Function Tests on Patient CRH

	Predicted	Date 5/15/87	Date 6/4/90
Vital Capacity L.	3.2	1.5 (47%)	1.3 (41%)
Total Lung Capacity L.	4.7	5.7 (121%)	6.5 (138%)
FEVI L. *	2.6	0.7 (27%)	0.4 (15%)
Maximal Midexpir. Flow Rate L/sec.	2.8	0.4 (14%)	0.2 (7%)
Carbon Monoxide Diffusing Capacity ml/min/mm Hg.	22	4 (18%)	7 (32%)

Forced Expired Volume in one second.

administration of bronchodilator, so that a concomitant diagnosis of asthma could not be ruled out.

Several determinations of AAT concentration from 1990-91 ranged from from 80-99 mg %, indicating a lower level of intermediate deficiency, with an SZ phenotype.

Family history revealed that the patient's mother died in 1986 of congestive heart failure without a personal or family history of lung disease; however, liver disease of uncertain type was reported in her family. The patient's father, with personal and family history of asthma, had an MZ phenotype of AAT. The patient's brother, VR, without definite lung disease, is a smoker with an MZ phenotype and AAT concentration of 195 mg %. He has a daughter with severe asthma and an MZ phenotype with an AAT level of 122 mg %. Several other siblings of CRH with histories of asthma have not as yet been tested. A son and a daughter of CRH also have asthma; the former has an MS phenotype with AAT 272 mg %, and the latter MZ with 129 mg. % (Figure 4).

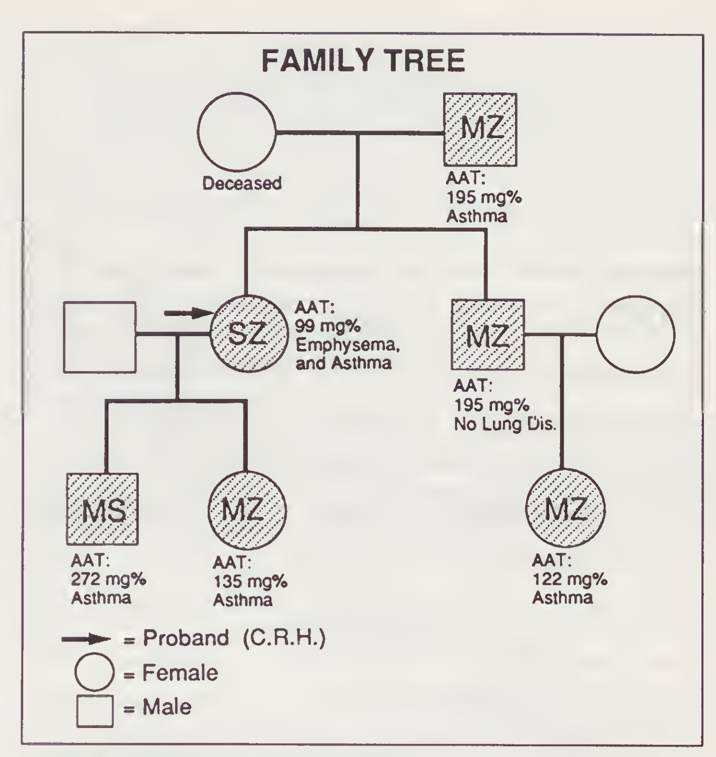


Figure 4: Family tree of patient CRH.

Therapy with biweekly injections of alpha-l-antitrypsin (Prolastin R) was initiated in August of 1991. The patient has been stable since then, without further deterioration of pulmonary function.

Observations

A total of 82 patients from the Beth Israel facility have been studied to date, including 55 previously reported (4) and 27 new patients. The results of AAT studies are indicated in Tables 2 and 3. Sixty three patients were found to have an MM phenotype, all with serum AAT concentration within the normal range (>190 mg %). Two patients were classified as an Mnull phenotype, having reduced AAT concentrations, but with only M bands found on phenotyping. The remaining 17 patients had an S and/or Z variant as follows: 13 MS, 3 MZ, 1 SZ. Table 2 summarizes the clinical and demographic data comparing the patients in two groups: 1) the MM and Mnull patients vs. 2) those with S or Z (variant) containing phenotypes. The two Mnull patients were classified with the MM's because of our previous observations that an Mnull phenotype does not predispose to bronchospasm (5).

The MM group has a higher proportion of males as compared to the variant group, although this is not statistically significant because of the small number of males found in our clinic population. The mean age is 51 years for the first group, 45 years for the second. A family history of asthma-like illness in a first degree relative (parent, sibling, or child) was reported by 39 of 65 MM subjects (60%) and 100% of the variant

Table 2.
Demographic and Clinical Data On Puerto Rican Patients at Beth Israel Hospital, New York City

AAT Phenotype	M or Mnull	S or Z	P
Total Number	65	17	
Male Sex (%)	20 (31%)	2 (12%)	NS
Current Age (yrs)	51 (23-78)	45 (27-65)	NS
Disease Onset age	27 (1-61)	20 (0-58)	
F.H. Lung Disease (%)	39 (60%)	17 (100%)	<.001
Smoked >10 pack/yrs (%)	29 (45%)	1 (6%)	.005
Mean FEVl as % Predict.	62 + 18	65 ± 18	NS
* Lability index	0.57 ± .27	0.58 ± .27	NS
Mean serum IgE Units	362 ± 775	525 ± 562	NS
Max. Eosin. Count per mm^3	399 ± 353	703 ± 900	NS
Emphysema present+			
Number by Xray (%)	8/57 (14%)	1/17 (6%)	NS
Number by DCO (%)	8/50 (16%)	0/16 (0%)	NS

* FEVl=Forced Expired Volume in one second. Lability index is highest minus lowest FEVl observed divided by mean.
+Patients with diagnosis of emphysema based upon chest films and/or carbon monoxide diffusing capacity, expressed as percent of total number of whom that test was available.

Table 3.
Non-MM Phenotypes Detected in Puerto Rican Pulmonary Patients at Beth Israel Medical Center, New York City

#	Phenotype	AAT mg/% Range	Mean
2	Mnull	140-150	145
1	SZ	87	——
3	MZ	90-215	153
13	MS	130-300	164

patients. A lifetime smoking history of over 10 pack/years was present for 29 of the MM patients but only 1 of the variant group. These data on family history and smoking history, which were obtained in all cases prior to knowledge of the patient's AAT phenotype, each indicated a statistically significant difference between the two groups studied.

Mean Forced Expired Volume in one second (FEV1), expressed as percent of predicted, did not differ between the two groups; nor did the mean FEV1 lability index. Serum immunoglobulin E levels, obtained in 46 of the MM patients and 12 of the variant group, was higher in the variant group, as was the maximal observed blood eosinophil count. However, due to large standard deviations, neither of these differences in these indices between the two groups was statistically significant.

Clinical evidence of emphysema was found in 10 of 65 patients in the MM group. This was based upon the Radiologist's interpretation of chest roentgenograms (without information about smoking history or AAT status) in 8 patients, associated with reduced single breath Carbon Monoxide Diffusing capacity (DCO) in 6, and significantly reduced DCO in 2 patients with negative X ray readings. All but one of these 10 patients had been heavy smokers, and two had chronic hypercapnea. Only 1 patient of the Beth Israel variant group (plus the index patient CRH from New Jersey) had evidence of emphysema by X ray. This Beth Israel patient had a normal DCO, as did all of the 16 variant patients who were tested.

Discussion

Since the discovery of AAT abnormalities, a causal relationship with emphysema has been well established and generally accepted, mainly in individuals with a ZZ phenotype, but also in a few with SZ (6), and in heavy smokers with heterozygous MZ phenotype (7,8). Although smoking has a well established adverse effect on those with abnormal AAT phenotypes, the increased risk of the heterozygous AAT state for causing emphysema remains controversial, as does the possible relationship to bronchospasm and asthma.

We have previously reported a very high prevalence of S (15%) and Z (5%) variant AAT traits in our Puerto Rican control population without lung disease (4). This prevalence of Z trait is higher than that reported for any other ethnic population, while the S trait is exceeded in frequency only in Spanish (and Portuguese) populations, from which the trait undoubtedly derives. It may therefore seem paradoxical that emphysema is not more common in the Puerto Rican population, and is not associated with AAT abnormalities. Of the 82 patients we studied in New York City for chronic pulmonary obstructive symptoms, only 11 had evidence of emphysema, but only one of 17 with a variant AAT phenotype. Also, Cutter Laboratories has informed us that no residents of Puerto Rico have been treated with AAT replacement therapy for emphysema.

Patient CRH, reported herein, who was referred to us from New Jersey because of our known interest, is one of the few such individuals now being treated who are of Puerto Rican descent. Unlike the majority of patients with emphysema associated with AAT deficiency, CRH has primarily upper lobe rather than

lower lobe disease. This may be due to her prior upper lobe pneumonias. Pneumonia is a known precursor of emphysema in susceptible individuals (9), possibly because of release of leukocyte elastase in affected lung tissue.

In contrast to COPD, asthma appears to be extremely prevalent in those of Puerto Rican descent here in New York City, as compared to other ethnic groups, with a relationship to S and perhaps Z AAT traits suggested. Increased bronchial hyperreactivity in individuals with S or Z trait has also been reported in a presumably non-Hispanic population in Omaha, Nebraska (3). Smoking is very uncommon among our Puerto Rican patients and controls with AAT variant phenotypes, presumably because of this tendency to bronchial irritation. Avoidance of smoking, which did not occur in the unfortunate patient CRH, probably protects most of these patients from developing emphysema. On the other hand, several of our MM patients, who were smokers, did indeed show radiological and/or physiological evidence of emphysema. Thus we suggest that variant AAT phenotypes paradoxically appear to protect our Puerto Rican patients from developing emphysema.

Acknowledgments: *The authors would like to thank Dr. Helene Goldfarb of the Radiology Department of Beth Israel Hospital, New York City, and Dr. Michael J. Gentlesk of Voorhees, New Jersey for their cooperation in preparing this report.*

Resumen: **Hemos reportado previamente que los fenotipos variantes "S" y "Z" de alpha-1-antitrypsin (AAT) se encuentran frecuentemente en los Puertorriqueños residentes en la ciudad de Nueva York, y usualmente están acompañados de asma de los bronquios, que también se encuentra frecuentemente en ese grupo de personas.**

Una muestra seleccionada al azar de 82 pacientes Puertorriqueños del Centro Médico de Beth Israel con asma y/o enfermedad de obstrucción crónica pulmonaria (COPD) encontró 65 del fenotipo PiM y 17 con los fenotipos variantes MS, MZ, o SZ. Todos estos últimos resultaron tener una historia familiar de asma en un pariente inmediato y de estos solo uno era fumador, una diferencia significativa en estos dos parámetros de los pacientes con fenotipo PiM. Los pacientes con fenotipos variantes tambien tienden a diferir de los del grupo con PiM en varios otros parámetros reflejan un diagnóstico asmático mas que uno de COPD. La mayoría eran mujeres, jóvenes, y con altos niveles de IgE y eosionophilia en la sangre. Solamente uno de los 17 pacientes con fenotipos variantes tenia evidencia de enfisema en los rayos X de la cavidad torácica, y ninguno cuando medido por capacidad difusión de monóxido e carbono, comparado con el 14% de los pacientes con PiM.

En contraste, vimos un paciente, referido desde Nueva Jersey con fenotipo SZ y serum AA de 80 mg% con asma toda su vida que se convirtió en fumador frecuente y desarrollo enfisema grave a una temprana edad.

Sugerimos que los fenotipos heterozigóticos S y Z producen una reacción espasmódica en los bronquios que hace quo los pacientes Puertorriqueños no fumen, reduciendo así el riesgo de enfisema.

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Articulos Originales:

Obstructive Rectosigmoid Endometriosis: A Case Report

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Summary: **This is the case report of a 36 years old female patient with long history of low abdominal pain and dysmenorrhea, associated with an enlarged uterus. After extensive work up she underwent exploratory laparotomy and in addition to an enlarged uterus, a rectosigmoid mass associated with extensive inflammatory reaction was found. Since the colon was not prepared an abdominal subtotal hysterectomy was performed and the operation ended, to be followed with work up of the rectosigmoid mass.**

A thorough workup revealed a low lying rectal mass, just inside the rectal wall itself, with no intralumnal extension. She was taken to the operating room and a low anterior rectal resection was performed with no post-operative sequelae.

Pathologic examination of the specimen revealed rectal wall endometrioma. The importance of this disease entity with a current review of the literature will be presented.

Key Words: *Endometriosis, Intestinal Obstruction, Intestinal Endometrioma*

Introduction

Endometriosis was first described in 1921 by Sampson as "The presence of ectopic tissue, which possesses the histological structure and function of the uterine mucosa".[1] However, it should also include the abnormal conditions which may result not only from the invasion of organs and other structures by this tissue but also from its association to menstruation. Endometriosis, even though it is a benign lesion, possesses the potential to invade tissue, and to metastasize by lymphatics, and by direct implantation as in most malignancies.

Endometriosis of the rectal wall is a rare presentation of this disease process. It has been reported in the English literature in very few instances. It is our purpose to discuss the case report of a female with rectal wall endometrioma and the most pertinent literature associated with this subject.

Case Report

This is a 36 years old female patient with congenital deafness who was seen at the gynecology clinic of the Mayaguez Medical Center on May 1991 due to dysmenorrhea and metrorrhagia of several months duration.

Several therapeutic trials were attempted, including hormonal therapy, but she failed to improve. Extensive diagnostic work up was done including complete blood counts, chemistry, barium enema, intravenous pyelogram, abdominal and pelvic sonograms; all of which were non-conclusive, showing only moderate uterine enlargement.

The patient was taken to the operating room, in view of her incapacitating symptomatology, where exploratory laparotomy demonstrated a large uterus and a hard, well localized, proximal rectal mass with surrounding inflammatory reaction and adhesions to the uterus but, without evidence of intra luminal intestinal obstruction. Because of difficulties in separating the posterior uterine wall from the rectosigmoid mass, a subtotal hysterectomy was performed.

Surgical consultation was obtained intraoperatively and the decision was reached not to perform any further surgery but to close the abdomen and return later after further studying of the patient. Proctosigmoidos copy revealed a partial obstruction of the upper rectum with no visible lesion. CT scanning of the area demonstrated an intrinsic rectal mass. A bowel prep was instituted and she was taken to the operating room and a stapled low anterior resection was performed successfully.

Pathology report revealed an endometrioma of the proximal rectum and distal sigmoid. She has been followed in the surgery and gynecology clinics postoperatively for over one year and she is asymptomatic.

Discussion

Endometriosis is a relatively common condition affecting mainly young women with a range of incidence between eight and twenty seven percent.[2]

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It can be divided into two groups: adenomyosis or internal endometriosis, in which there is invasion of myometrium; and external endometriosis, in which tissues outside the uterus are affected.

Endometriosis depends on ovarian hormones for its occurrence and for this reason it confines its, clinical importance to the reproductive years of woman life. It is most commonly seen in the fourth to fifth decades of life, generally presenting with dysmenorrhea and, or menorrhagia of increasing severity.

Scott and Associates found that 49.5 percent of their cases were in this age group and 83.0 percent occurred before age 40.[3] The typical patient with endometriosis is a multiparous, high income woman in her fourth decade of life.

Endometriosis implants have been reported in a variety of sites [4] [Fig #1]. The more frequent sites are the: utero, ovary posterior serous surface of the uterus, uterosacral ligaments, cul-de-sac, cervix, vulva, peritoneum, bladder and rectosigmoid. (Table 1).

In the intestine, in addition to the involvement of the outside of the rectal wall [Fig #2] it can affect the sigmoid colon wall itself resulting in thickening of the wall and luminal obstruction [Fig # 3].

Obstructive symptoms are more frequently seen with ileal endometriosis (25%) that with colonic involvement (6%)[4], even though endometriosis is the fifth most common benign tumor of the colon. Generally the lesion extends through the serosa but rarely it penetrates or invades the mucosa. This is a very useful point in differentiating endometriosis from adenocarcinoma.

On the other hand, in rare occasions, endometriosis can involve the full thickness of the intestinal wall and even produce polypoid growths within the bowel lumen. Barium Enema and colonoscopy is only helpful in approximately ten percent of colonic endometriosis [4]. It can be diagnostic in cases in which cyclic rectal bleeding occurs and a biopsy can be obtained.

Table I
Location of External Endometriosis

TYPE	SITE	NUMBER	PERCENT
Ovarian	One Ovary	285	55.2
	Both Ovaries	125	24.6
Superficial and small spots on serosa	Diffuse scattered pelvic	171	33.1
	Uterine Surface	73	14.1
	Tubal Surface	71	13.7
	Posterior Cul de sac	21	4.7
	Uterosacral ligaments	19	3.7
	Omentum	3	0.6
	Round ligaments	2	0.4
	Broad Ligaments	1	0.2
	Small Intestine	1	0.2
	Appendix	7	1.4
Intra-abdominal nodules	Rectovaginal septum	8	1.6
	Rectovaginal septum with rectosigmoid involvement	20	3.9
	Retrovaginal septum with vaginal extension	9	1.8
	Sigmoidal	4	0.8
	Anterior cul-de-sac	2	0.4
	Anterior cul-de-sac with bladder involvement	5	1.0
	Tube	8	1.6
	Broad ligament	4	0.8
	Round Ligament	3	0.6
Extraperitoneal	Cervix	13	2.5
	Inguinal	4	0.8
	Umbilical	4	0.8
	Incisional-ventral	4	0.8
	Incisional-vulva	1	0.2

Note: Total is more that 100%, because of multiple lesions.

The appendix, cecum and ileum are frequently involved in the process of endometriosis but not as common as the rectosigmoid.[4] Marked decidual reaction and changes might occur with pregnancy resulting in spontaneous perforation of the appendix.[5]

At surgery, if no pathologic report is available, it is very difficult to differentiate between endometriosis and carcinoma of the bowel wall.

Endometriosis also produces severe inflammatory reaction that can result in intestinal obstruction secondary to adhesions or angulation of bowel after the occurrence of fibrosis. These sequela of intestinal endometriosis may not appear until the patient is in the postmenopausal age. Bowel resection should be done if obstruction or marked caliber compromise of the bowel is present or any doubt exists about the nature of the lesion. Castration alone is not adequate treatment since subsequen fibrosis may further narrow the bowel lumen.

Because many women with endometriosis are young, at the time of surgical intervention it is important to maintain their ability to reproduce at all costs, their gynecologyst and surgeon must work together in the management of these cases for optimal decision making.

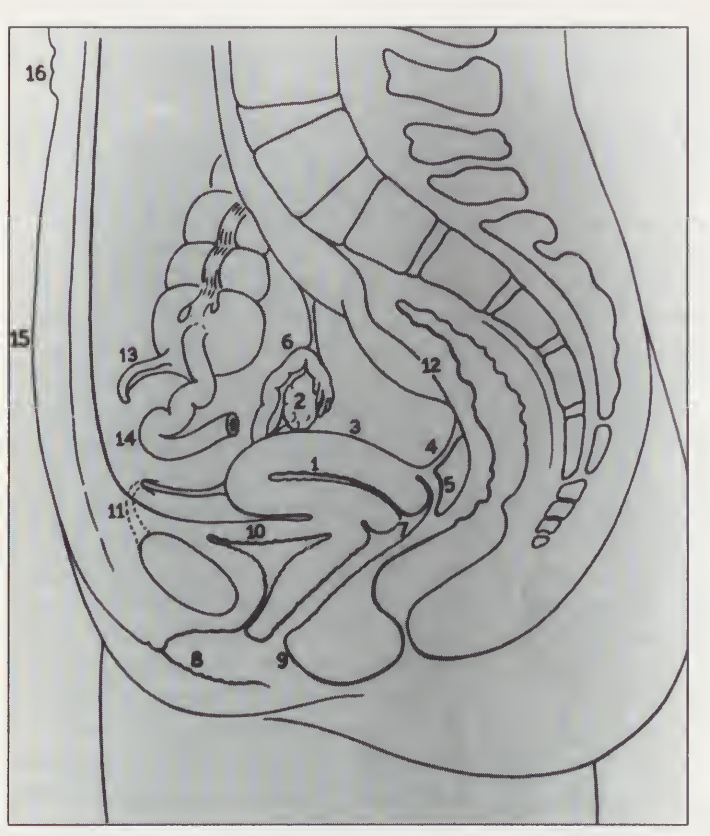


Fig. 1 Common Sites of Endometriosis



Fig. 3 Barium Enema showing obstruction of the Colon

Resumen: El presente artículo es el caso de una paciente femenina de 36 años de edad con historia de dolor abdominal bajo, dismenorrea y dolor de espalda bajo asociado con angrandamiento uterino. Luego de evaluación y estudio extenso se realizó una laparotomía exploratoria que demostró además del agrandamiento del útero, una masa en el rectosigmoide, con marcada reacción inflamatoria.

La resección quirúrgica fue llevada a cabo seis (6) semanas de la primera exploración, realizándose una resección anterior baja. Luego de la cirugía la paciente continúa asintomática y en excelente estado de salud.



Fig. 2 External Involvement of Sigmoid Colon

Este reporte muestra que una obstrucción rectal puede ocurrir como complicación de endometriosis de modo que se debe tener presente esta entidad en el diagnóstico diferencial de lesiones que puedan producir obstrucción rectal en pacientes femeninos adultas.

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Artículos Originales:

Cystic Duplication of the Stomach: Case Presentation and Review of Literature

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Summary: **Duplication of the stomach is an uncommon phenomena. They are hollow, spherical structures contiguous with the stomach, usually on the greater curvature that share a common blood supply and are invested by a common musculature and mucosa. Clinically they can be asymptomatic or can present as an abdominal mass, gastric bleeding or gastric outlet obstruction.**

We present the case of a male patient with gastric outlet obstruction due to external compression by a gastric duplication cyst. Our experience with this entity and review of literature is presented.

Key Words: *Gastric Duplication, Gastric Cyst, Enterogenous Cyst*

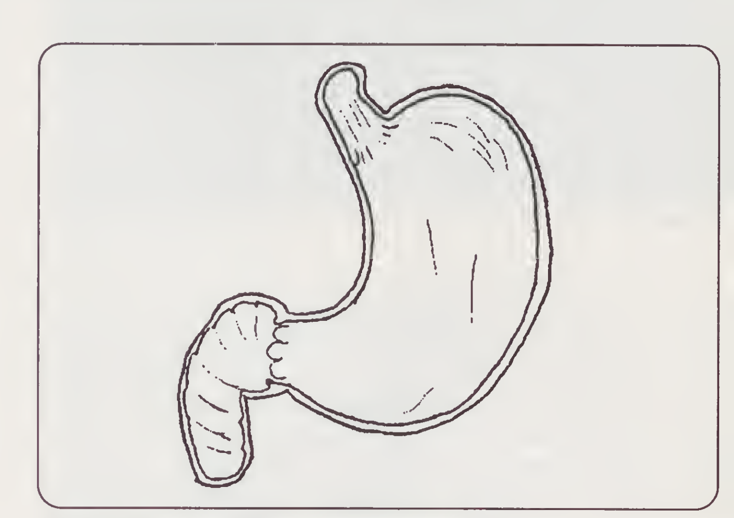


Fig. 1A. Diagram of a normal stomach.

Case Report

On July 10, 1993, a one year old boy with previous history of recurrent episodes of vomiting, already treated by physicians in USA, was evaluated in P.R. due to complaints of vomiting and fever. He presented with intermittent episodes of vomiting of three days duration, requiring medical treatment several times with intravenous fluids for correction of dehydratation.

Upon physical examination, his vital signs were: temperature 38.2C, pulse 100 and respiratory rate of 20 per minute. He presented a sick looking aspect, hypoactivity, but with adequate turgor and normoreflexia. Abdominal examination showed it was not distended, had adequate peristalsis, but was tympanic. No masses were palpable. Rectal examination was negative.

Hemogram presented leukocytosis of 14,300 with 70% neutrophils and 2 bands. Chemistry was negative. Analysis and culture of urine and spinal fluid were also negative.

Roentgenographic evaluation with flat and upright abdominal films revealed diffuse haziness with air fluid levels in stomach but gasless in small and large bowel. Nasogastric tube presented coffee ground material.

After evaluation of the case the assessment of possible gastric outlet obstruction was reached exploration of the abdomen was recommended. Upon exploration a mass of approximately 9.5 x 7 x 6.5 cm was found in the area of the gastric antrum, producing partial obstruction due to external compression (Figure lB.) The Blood supply of the cystic mass came from the gastroepiploic vessels. A Truncal vagotomy and antrectomy was done. Reconstitution of gastrointestinal tract continuity was done by an antecolic Gastrojejunostomy anastomosis (Figure lC).

Postoperatively, he developed paralytic ileus that resolved with nasogastric decompression. Patient was discharged home seven days after surgery and follow up upper gastrointestinal series done 13 days post surgery was negative for leakage with adequate continuity of gastrointestinal tract.

Gross pathologic description presented a well circumscribe mass. The external surface was smooth, glistening with rather well developed musculature and prominent vascular markings. On opening, the cyst was filled with clear fluid. There was no communication of the cyst with gastric or enteric lumen. The inner surface appeared smooth and glistening in area trabeculated with few ulcerations of up to 0.8 cm in greatest diameter. Microscopic examination of the mass revealed simple low columnar epithelial lining and well developed muscle layers (Figure 2A & B). Heterotopic pancreatic tissue was identified (Figure 2C). Acute inflammatory cells were found at the areas of ulceration (Figure 2D).

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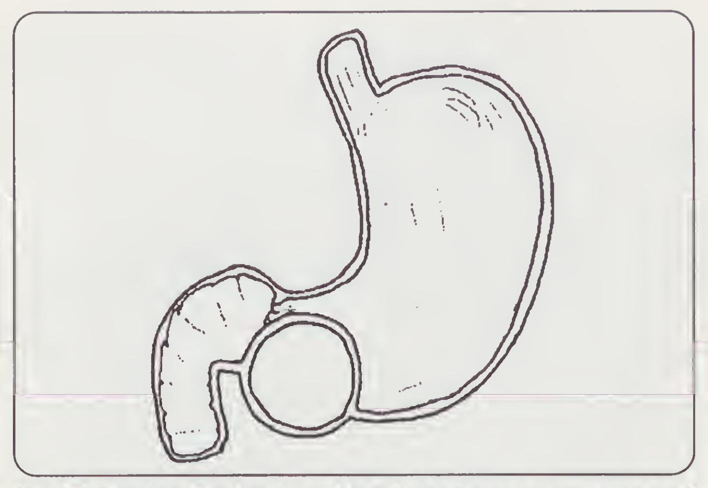


Fig. 1B. Gastric Duplication. Note the extrinsic compression of the gastric outlet.

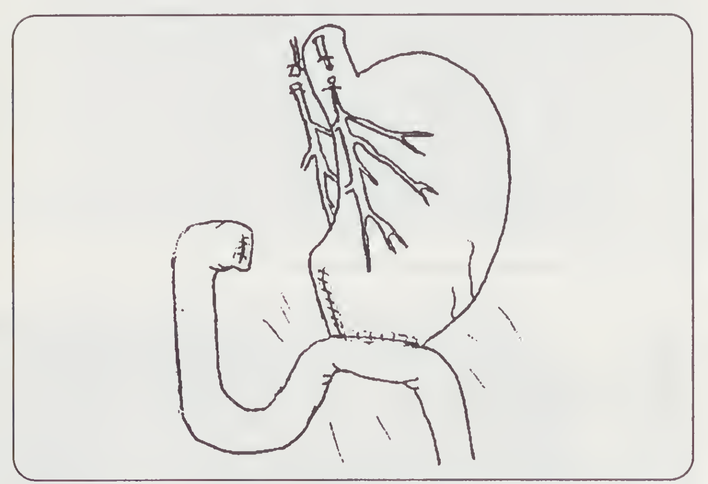


Fig. 1C. Surgery done in this case: vagotomy, antrectomy and antecolic gastrojejunostomy.

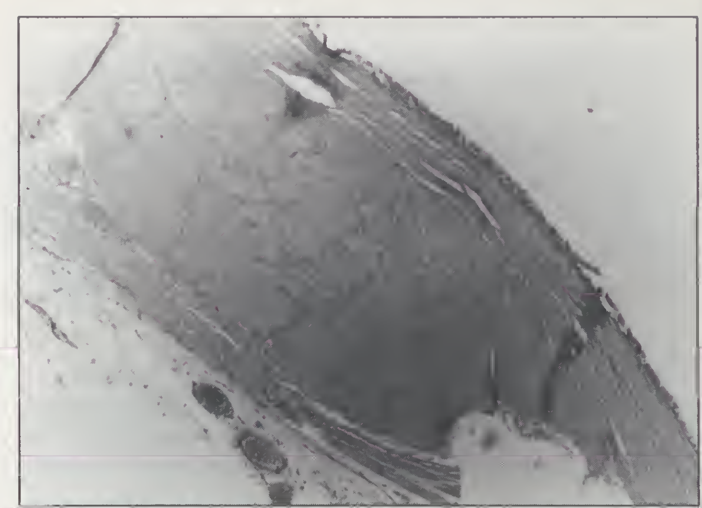


Fig. 2A. The cyst wall shows two layers of smooth muscle and a lining of low columnar epithelium.



Fig. 2B. High power view of the columnar epithelial lining.

Discussion

Enteric duplication are rare anomalies that can occur anywhere in the alimentary tract, more common in the ileum and least in the stomach. These duplicated segments are in apposition to any portion of the alimentary canal and may be completely independent of the adjacent normal intestine or share its lumen, blood supply and muscle coats with lining of gastric, small bowel or colonic mucosa.[1] They can be classified as closed cystic duplications (80%) or tubular duplications that communicate with the intestinal lumen (20%).[2] The duplication cyst may contain gastric and in some instances pancreatic tissue as well[3].

Duplication of stomach is an uncommon phenomena that represent approximately only 2-8% percent of gastrointestinal duplications[4]. They are hollow, spherical structures contiguous with the stomach, usually on the greater curvature[5]. The incidence is twice as often in females as in males. At present, the origin of this condition is unknown but hypothesis about the etiology implicate a possible environmental embryologic condition that can explain the associated congenital anomalies seen in 35% of the cases, the most common one being another cyst especially in esophagus or duodenum, but it is also associated to pancreas malformation, accessory spleen and neuroaxis (i.e vertebral) anomalies.[2,4,5] In almost all the cases reviewed, heterotopic pancreatic tissue was found in the gastric cyst. This finding can be explained by the embryological foregut development of stomach and pancreas.[2]

The clinical manifestation of this entity is almost confined to the first year of life as in our report, but occasionally the condition can be relatively asymptomatic for years.[4,6,7] Symptoms include abdominal pain or are associated to the mechanical compression and obstruction of the cyst to the gastric outlet, presenting with vomiting and gastric distention. An abdominal mass is sometimes palpable or can present with melena due to hemorrhage from the gastric mucosa of the cyst if the duplication communicates with the normal bowel. Several complications can occur such as hemorrhage, perforation, peptic ulceration, torsion and malignant transformation.[2,4,5,6,7] In the neonatal and pediatric group the enteric duplication cysts present a benign course. Only ten cases of malignancy arising from

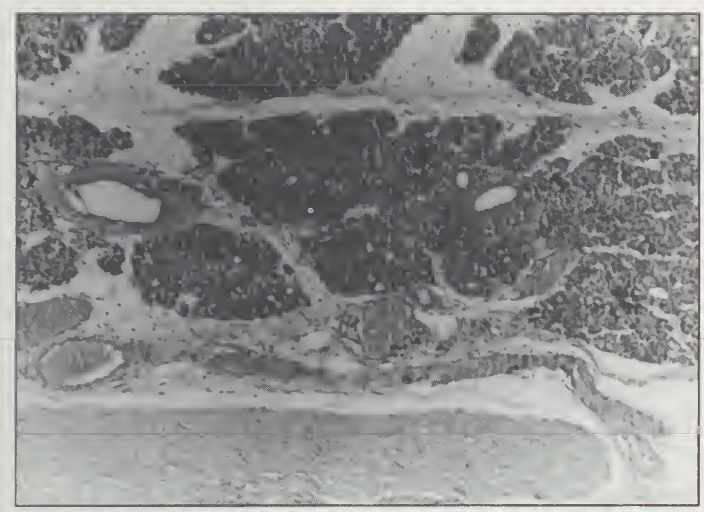


Fig. 2C. Heterotopic pancreatic tissue is identified within the cyst wall.



Fig. 2D. Ulcerated area covered by and exudate composed of acute inflammatory cells.

enteric duplications have been reported in the literature, and all are adults with an age range of 37 to 72 years with a very high female to male ratio of 8:2. The histologic nature of these tumors are adenocarcinomas in eight, squamous carcinoma in one and epithelial malignancy in one. From this data, three cases of carcinoma in gastric duplication are found.[4]

From the diagnostic point of view, since these lesions occur so infrequently, they are often not suspected and the diagnosis is done intraoperatively. Occasionally the cyst can be identified by sonography or computer tomography. A ^{99m}technetium-per-technetate scanning demonstrate the presence of gastric mucosa in the cyst. Barium meal and enema are only indirect diagnostic tools since duplications do not fill with the opaque agent during the study. If the cyst is large enough to produce compression an extrinsic defect in the barium column can be noted in the stomach or near the colonic splenic flexure respectively.[4,5,8]

Surgical management is recommended even in the asymptomatic patient when this pathology is found as an incidental finding due to the potential for complications of this condition. The procedure depends on the severity of the process found. The preferred method is surgical excision[7] but sometimes the extension, size and pathological condition of the cyst (ulceration with rupture and colitis with possible gastrocolic fistula) dictates a more extensive procedure, even a subtotal gastrectomy.[9]

In our special case, the child mentioned was presenting symptoms during the first year of life without an adequate workup for evaluation and was treated on an emergency basis due to the gastric outlet obstruction. Probably a simple more benign procedure could be done with an early diagnosis.

In conclusion, a high index of suspicion is needed to identify this rare condition. Once the diagnosis is made associated congenital malformations must be evaluated. Early recognition can avoid an extensive surgical procedure that could be resolved with a simple cyst excision. During surgery, the surgeon must be aware of additional noncontiguous duplications sometimes associated to this condition.[9]

Resumen: **Duplicación del estómago es un fenómeno infrecuente. Son estructuras huecas, esféricas contiguas al estómago, usualmente en la curvatura mayor que comparten irrigación sanguinea y están revestidas por una musculatura y mucosa común. Clínicamente pueden ser asintomáticas o pueden presentarse como una masa abdominal, sangrado gástrico u obstrucción de la salida gástrica.**

Presentamos el caso de un paciente varón con obstrucción de la salida gástrica debido a compresión externa por una duplicación gástrica quística. Se presenta nuestra experiencia con esta entidad y revisión de la literatura.

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El Mosquito en la Etiología de Entonces y la de Ahora:
Comentario a "El Mosquito en la Etiología Moderna" de Francisco Del Valle Atiles, 1903

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Uno de los "artículos de primera plana" del Boletín de la Asociación Médica en su año inaugural de 1903 está dedicado al rol del mosquito en las más recientes teorías para explicar la causa de las enfermedades.(1) El texto tiene dos propósitos principales, la divulgación de nuevos descubrimientos, y concientizar la clase médica para que apoye las obras públicas y privadas necesarias para la eliminación de los mosquitos. Su autor, Francisco del Valle Atiles (1852-1928), nació en Puerto Rico, se graduó de medicina en Sevilla en 1872 y descolló como político, siendo el primer alcalde de San Juan bajo la ocupación americana en 1898 y luego de 1907 a 1910.(2,3) Esa guerra, además de radicales cambios para Puerto Rico, Cuba, Filipinas, España y Estados Unidos, provocó importantes desarrollos en el conocimiento de las enfermedades tropicales. En los años del cambio de siglo, la aplicación de los hallazgos de Pasteur, Lister y Koch respecto a la etiología bacteriana de las enfermedades hizo posible empezar a develar los componentes de las enfermedades producidas por parásitos y transmitidas por vectores. La llegada de médicos norteamericanos a las islas conquistadas cambió las concepciones locales de la salud pública y provocó el estudio de antiguos problemas de salud desde nuevos puntos de vista. El más famoso de estos acontecimientos fue la comprobación (pues ya se sospechaba años antes) de que el mosquito *Aedes aegypti* (entonces *Stegomyia*) es el vector de la fiebre amarilla. La virtual eliminación de esta enfermedad en La Habana, mediante el "saneamiento" de esa capital (eliminando criaderos del mosquito), y la terminación del canal de Panamá (1904-1914), hecha posible por la aplicación de los mismos métodos, se convirtieron en paradigmas de cómo la destrucción de los mosquitos podía "impulsar el progreso nacional."

Cuando salieron a la luz los primeros números del Boletín de la Asociación Médica de Puerto Rico, las enfermedades transmitidas por mosquito que afectaban la población puertorriqueña eran la malaria o paludismo (transmitida por *Anopheles*) y la filaria o elefantiasis (transmitida por *Culex*). La malaria era, de estas dos, la de mayor extensión e incidencia, y Del Valle, apropiadamente, le dió mayor relevancia en su texto. Al cabo de varias décadas, medidas de saneamiento ambiental como las propugnadas por Del Valle (costeadas en gran medida por fondos gubernamentales para emplear obrero durante la Depresión y luego por el proyecto de "Malaria Control in War Areas") y un esfuerzo intenso para tratar los enfermos y suprimir su infectividad llevaron a la erradicación de la transmisión de malaria en Puerto Rico en 1953.(4) Otros casos notificados posteriormente han sido por infecciones adquiridas en el extranjero.

Del Valle escribió su artículo en Baltimore, citando autoridades sanitarias y académicas de la ciudad y rindiendo tributo a Lazear, cuya muerte en La Habana por fiebre amarilla, tras hacerse picar de un mosquito infectado, marcó trágicamente las investigaciones de la junta americana para dilucidar la causa de esa enfermedad, pero también ayudó a probar fuera de duda el rol del *Aedes aegypti* como vector. Para los que ahora leemos sobre estos acontecimientos, acostumbrados a la discusión sobre quién tiene primacía en el descubrimiento del vector (el cubano Carlos Finlay, el americano Walter Reed, o aún el francés Luis Daniel Beauperthuy) es sorprendente ver que Del Valle omite toda referencia a esa controversia. La omisión puede estar motivada por descuido (aunque el tema se evita de forma tan cuidadosa que es imposible dilucidar si tiene opinión), diplomacia, o aún ignorancia, pues los eventos en cuestión son tan recientes para el autor que muchas de sus repercusiones no se habían hecho sentir todavía. El lector interesado en esa controversia debe consultar el reciente análisis de Delaporte, que examina las contribuciones de los diferentes investigadores en el contexto del desarrollo de los estudios científicos de esa época.(5)

La fiebre amarilla no tuvo, en el Puerto Rico del siglo XIX, la incidencia que presentó en Cuba. Aunque hubo epidemias, y dos gobernadores españoles murieron con ese diagnóstico, los últimos casos ocurrieron en 1897.(6) A pesar de la ausencia de

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fiebre amarilla en la isla, Puerto Rico participó en la campana panamericana de erradicación del *Aedes aegypti* en los años cincuenta, pero sin conseguir su completa eliminación. Muchos países latinoamericanos sí lograron ese objetivo, lo que no pudo evitar el colapso de la campaña antes de llegar a la meta final. Desde entonces, la mayoría de esos países ha reconocido la reinfestación de su territorio por el mosquito. Como vector del dengue, el *Aedes aegypti* ha cobrado nueva notoriedad, y retomado su papel de amenaza pública en los países donde la fiebre amarilla fue hace tiempo erradicada. Los llamados del doctor Del Valle a la eliminación del mosquito se repiten ahora, no para impulsar el progreso, pero sí para mejorar el ambiente, y sobre todo la salud. De los tres "medios más eficaces para destruir los mosquitos" que menciona el artículo, el primero sigue siendo el mejor—drenaje de criaderos, que en el caso del *Aedes aegypti* no son pantanos, mangles ni cunetas, sino los pozos, pailas, latas y otros recipientes de agua relativamente limpia. La kerosina no se usa, por su costo y adverso impacto ambiental, pero hay nuevos larvicidas (también caros y potencialmente peligrosos). Los peces larvívoros siguen siendo recomendados para algunos criaderos como cisternas, pero se están estudiando otros agentes de control biológico como los copépodos, unos crustáceos microscópicos que se comen las larvas del mosquito. La asperjación de insecticida en forma de neblina ("volumen ultra bajo") es un método de origen y popularidad posterior a Del Valle, y que está cayendo en desuso, por su costo, impacto ambiental y baja eficacia (7).

El artículo del doctor Del Valle es un ejemplo de las mejores características de lo que ha publicado el Boletín de la Asociación Médica a lo largo de sus noventa años de historia: afán de progreso, preocupación por los problemas y la labor de Puerto Rico y sus médicos, apertura a las novedades del exterior, y empeño por difundirlas en el país.

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Artículos Originales:

In Memoriam
Fermín Sagardía Pérez, Ph.D.: Bioquímico

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Biografía Personal

No conocí a Fermín Sagardía, lo que me provee una gran ventaja: la distancia y la frialdad. Hablé con él una sola vez, en 1974, en el Hospital Municipal, en el mes de agosto. Lo demás, me ha venido por referencias.

Fermín nace en San Sebastián, el 28 de abril de 1940 y fallece el 22 de agosto de 1975. Falleció muy joven, demasiado joven, a los 35 años de edad, que es cuando se empieza a producir a gran escala. Así que con él, se ha perdido a un visionario, a un maestro, a un pensador y a un forjador de vocaciones.

Un hermano nuestro, Agustín, que fue profesor suyo de química en la Escuela Superior Narciso Rabel, me decía que Fermín asistía a las clases de química, aún cuando no estaba en el grupo correspondiente, es decir, se encontraba en noveno grado, hacia los 14 años de edad. Ahí ya estaba la brújula apuntando el norte. En esa escuela se ganó el primer premio al mejor proyecto por parte de la Sociedad Americana de Químicos.

Estudia química en el Colegio de Mayagüez, donde termina su bachillerato en mayo de 1960,(Cum Laude), mereciendo la Medalla Luis Monzón,(1,2). Se traslada en una época dificil a Rutgers, donde termina su Maestría en 1961 y su Ph.D. en 1965. Hace unos años, su mentor y consejero, el Prof. Green, en una carta personal me confesaba que en toda su vida había tenido unos 5 alumnos excepcionalmente brillantes. Pero que no sabría cómo ordenarlos en prioridades. Que todos eran muy buenos. Fermín estaba en ese grupo.

Al regresar a Puerto Rico, se une al claustro del Colegio de Mayagüez, como Catedrático Auxiliar e Investigador Asociado. Recuerdo perfectamente a Fermín ofreciendo un curso de Fisiología Celular en 1967, en el edificio de Biología, (De Celis), una tarde de abril, en el primer piso. Se le veía feliz y contento con lo que hacía, vestido con un pantalón marrón, camisa blanca impecable, delgado, con las gafas escrutadoras que grababan todo lo que veían.

Hacia 1966, *El Mundo* publica una foto del Instituto de Biología Marina del Colegio, donde se aprecia a



Fig. I. Fermín Sagardia Pérez, Ph.D., circa 1973.

Fermín, sentado al lado del Dr. Manuel Díaz Piferrer. La Fundación Nacional de Ciencias le había otorgado a Fermín un donativo para estudiar la fosforilasa del músculo de la cocolía, (cangrejo azul).

Hacia finales de 1967, Fermín se traslada al Departamento de Microbiología de Ciencias Médicas en Rio Piedras. Conducía un Peugeot, que era de los pocos que circulaban por Puerto Rico. Entra con el rango de Catedrático Auxiliar y tiempo más tarde es promovido a Catedrático Asociado. Según él me indicó en 1974, el Colegio se había politizado demasiado y el Dr. Américo Pomales Lebrón le pidió que explicara la parte bioquímica de la microbiología, que se suele hacer al principio del curso. En 1978, yo coincidí con el Dr. Pomales Lebrón en el claustro de la Escuela de Medicina de Cayey. Su opinión sobre Fermín era formidable. Lo consideraba uno de sus mejores hallazgos. Mejor era imposible.

En el Recinto de Ciencias Médicas, estableció la Cátedra de Fisiología Microbiana; fue miembro del Comité de Estudios Graduados; dirigió los Seminarios de Ciencias Básicas y perteneció a muchos comités, llevando a cabo una tarea ejemplar.

La primera vez que coincidimos en una reunión fue

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en 1966. En aquella ocasión, nos habíamos reunido en la Asociación de los Pepinianos, en Mayagüez. Tratábamos de hacer una reunión con todos los que habían pertenecido alguna vez a nuestro grupo. Se mencionaba un nombre y él alzaba la mano y decía que conocía a la persona, que se encargaba de avisarle para la reunión. O que conocía a algún familiar y que se comprometía con avisarle. Nunca se le fueron los humos a la cabeza y recordaba sus años de estudiante y de estancia en la Casa de los Pepinianos, muy cerca de la Cervecería India.

En el Recinto de Ciencias Médicas, destacó como ajedrecista. En sus últimos días, trabajó sobre un tema ambientalista: la degradación de benzotiopeno por Pseudomonas. Este trabajo se publicó en *Appl. Microbiol.*, 1975, 29: 722-725. En uno de los textos que separó de esa época, leíamos en la tarjeta de préstamo: "renovado por teléfono." Eso nos da una clave.

En agosto de 1974, con motivo de un viaje que realicé a Puerto Rico a través de la Asociación de Padres, fui a saludar al Dr. Francisco Alvarado y al Dr. José Del Castillo. (Mi intención era formarme con alguno de ellos dos. En 1983, Alvarado me proveyó de una ayuda para estar en su laboratorio durante unas semanas en París.) Hablando en agosto de ese año en el Departamento de Fisiología con el Dr. Alvarado, éste me dijo que Fermín estaba enfermo en la Sala de Hombres. Eran como las doce del mediodía de mediados de agosto y fuimos a visitar a Mincho. Yo me presenté. Se encontraba acompañado por doña Carmen, su madre. Los corticoides habían hecho su efecto y estaba edematoso.

Se puso las gafas y charlamos de su estancia en Mayagüez, de lo bien que le había resultado el Peugeot, de la publicación de su tesis en forma extractada en una revista de bioquímica y de la docencia en general. Alvarado me había indicado que su deseo era publicar un trabajo dedicado a la memoria de Fermín. Yo me le adelanté y publiqué una revisión sobre el Efecto de Bohr, dedicada él, bioquímico hasta en el lecho de enfermo, (9).

La Fosforilasa

Todas las enzimas son proteínas pero no todas las proteínas son enzimas. En plena era alostérica, la fosforilasa es un ejemplo de ello, (7,8,9). Proteínas alostéricas son aquéllas cuyas propiedades biológicas cambian gracias a la unión con pequeñas moléculas, (los efectores alostéricos). Esto ocurre en lugares secundarios.

Las enzimas lo que hacen es el proveer un lugar libre de agua para que la reacción se lleve a cabo. El centro de muchas enzimas está compuesto por un metal. El alosterismo asegura operaciones cibernéticas, son lugares de integración de información química. Así, que las enzimas poseen al menos dos lugares importantes: un lugar donde se fija el substrato al enzima y otro donde se fija el modificador alostérico o inductor. El cambio en la conformación de la proteína va a determinar la reacción.

La teoría alostérica requiere de 6 supuestos:

1. Las proteínas alostéricas son proteínas compuestas de pequeñas unidades e idénticas, con un eje de simetría.
2. La simetría de cada grupo es idéntica.
3. La conformación de cada unidad asociada a otra, se encuentra en tensión o en estadio T.
4. Las proteínas alostéricas poseen al menos dos estadios reversibles, (T,R).
5. Existe transición T-R cuando un ligando u efector alostérico se fija en el lugar estereo-específico.
6. Al ocurrir la transición T-R, la simetría proteica se mantiene.

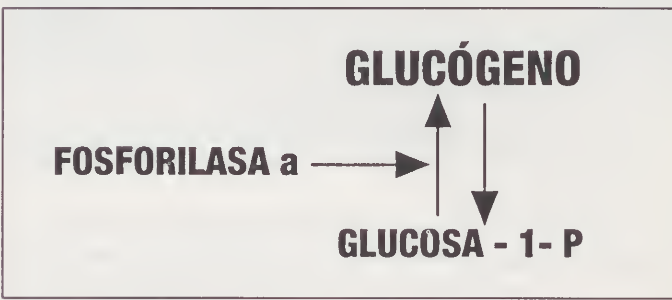


Fig.II. Conversión del glucógeno en glucosa mediante la acción de la fosforilasa a. La fosforilasa se encuentra presente en el músculo y en el hígado. Existen dos formas: la fosforilasa a y la fosforilasa b. La b es poco activa. La forma a es muy activa. La forma b se convierte en la forma a mediante una fosforilación de los radicales de serina de la misma enzima. Se necesitan una quinasa y AMP c. Esta conversión,eleva la concentración de glucosa en sangre. La adrenalina y el glucagón elevan la glucemia, (estimulando la enzima quinasa).

En algunas enfermedades, se almacena glucógeno por falta de fosforilasa. Normalmente, la sangre posee de un 0.06 - 0.10% de glucosa de forma más o menos constante. La ingestión de alimentos no consigue una concentración constante de glucosa en la sangre.

El glucagón produce en el hígado un incremento en la degradación del glucógeno, a través de la conversión de fosforilasa b, (inactiva), en fosforilasa a, (activa). Representa un mecanismo alostérico.

Veamos un ejemplo sencillo. La hemoglobina se encuentra en dos formas, la forma T, (tensa, en la cual, el oxígeno se une débilmente con la molécula), y la forma R, (relajada), en la que el oxígeno se une con gran facilidad. La curva sigmoide de la disociación de la hemoglobina nos muestra que la primera molécula de oxígeno es más difícil de fijarse que la segunda o la tercera. Ello se debe a que la primera molécula debilita los enlaces de la estructura. La hemoglobina es la única molécula en la que se ha demostrado transición alostérica in *situ,* con suficiente evidencia.

La fosforilasa es una enzima aislada por el matrimonio Cori en San Luis, por los años de 1940,(7). Lo que observó el matrimonio Cori fue que el glucógeno, en presencia de la enzima le iba cortando pedazos de glucosa. Es una reacción reversible *in vitro.* La enzima posee 97 subunidades kd.

El glucógeno es el almacén o moneda donde se meten los hidratos de carbono en el tejido animal. Se encuentra presente en el hígado y en el músculo. En el músculo, en ausencia de oxígeno, el glucógeno se convierte en ácido láctico y ATP. No hay conversión en glucosa porque no existe la glucosa 6-fosfatasa.

El ácido láctico producido en el músculo va al torrente circulatorio y de ahí al hígado, donde pasa a glucógeno. Es lo que constituye, el ciclo de Cori. La enzima que va a limitar el proceso de glucogenolisis, (el paso de glucógeno en glucosa), es la fosforilasa. Existen dos formas de fosforilasa, que se denominan, fosforilasa a y fosforilasa b. La fosforilasa a es muy activa con relación a la fosforilasa b. La fosforilasa b es inactiva y se convierte en fosforilasa a mediante la fosforilación de los radicales de serina. Se necesita una quinasa y un dador de fosfatos, (el ATP).

La fosforilasa b es activa únicamente en presencia de una gran concentración de AMP c, el cual actúa alostéricamente sobre la fosforilasa b. El ATP actúa como un efector negativo, compitiendo con el AMP. La fosforilasa b está inhibida por la presencia de ATP y de la glucosa 6-P.

La fosforilasa a es activa, independientemente de la presencia o no de estos substratos. Al estar el músculo en ejercicio, se eleva el AMP c, lo que activa la fosforilasa b.

Cuando la concentración de glucosa en sangre disminuye, se estimula la activación de la fosforilasa a. De esta forma, se degrada el glucógeno y la concentración de la glucosa en sangre aumenta. La fosforilasa a es un sensor hepático de la glucosa.

La unión de la molécula de glucosa con la fosforilasa a cambia el equilibrio R-T. Un exceso de glucosa inactiva la fosforilasa a. Ello ocurre, gracias a que se convierte en fosforilasa b. Además, se activa la glucógeno sintetasa. La fosforilasa b se activa por la acción de la adrenalina, (10).

Sagardía Pérez estudió la cinética de la fosforilasa a, (3). Para Sagardía Pérez, la fosforilación misma es el factor más importante en la conversión de la fosforilasa b en fosforilasa a. La tripsina remueve las fosfoserinas, inactivándose la enzima. Para Sagardía, la fosforilasa a tiene un mecanismo secuencial en su cinética. La fosforilasa b no lo posee. La fosforilasa b se inhibe en orden de un 50 % cuando la razón ATP:AMP es de 13. Para lograr la misma inhibición, la fosforilasa a necesita una proporción ATP:AMP de 10,000.

La fosforilasa a posee mayor afinidad por el AMP c

$$\text{FOSFORILASA b (ser-OH)} + \text{ATP} \xrightarrow{\text{quinasa}} \text{FOSFORILASA a (ser-O-}PO_3^{-2}\text{)} + \text{ADP} + H^{+}$$

Fig. III. Conversión de la fosforilasa a en fosforilasa b mediante la acción de una fosforilasa quinasa y el ATP. El ATP le provee un fosfato al residuo serina de la fosforilasa b. Esto ocurre cuando el organismo posee una tasa baja en glucosa. Realmente, quien actúa es el AMP c. La fosforilasa a degrada el glucógeno.

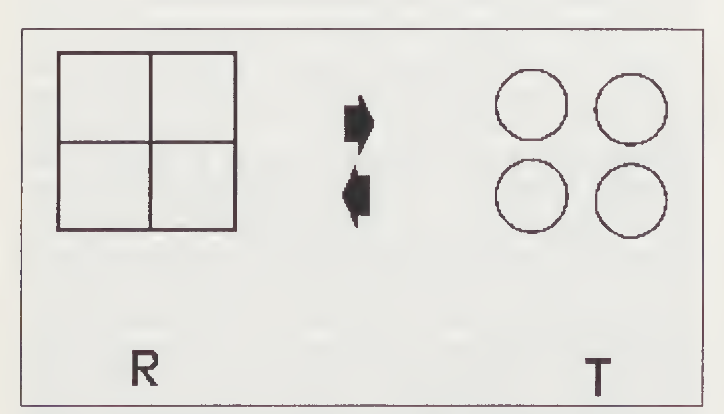


Fig.IV. Representación gráfica de una transición alostérica. Podemos considerar a las enzimas purificadas como globulares. Las enzimas alostéricas están compuestas por subunidades idénticas. Cada enzima tiene un centro específico de unión para cada ligando, o efector alostérico, (activador). La unión con el efector regula la acción enzimática. T, representa un estado tenso. R, constituye un estado relajado. La transición entre uno y otro es un cambio alostérico.

Tabla I.
Enzimas alostéricas y sus efectores.

Enzima:	Efector alostérico:
Hexoquinasa	Glucosa 6-P
Fosforilasa	AMP, ATP, G-6P
Fosfofructoquinasa	Pi, AMP, FDP, ATP, citrato, NH3
Isocitrico deshidrogenasas	AMP c
Treonina desasminasa	L-Valina
Aspártico transcarbamilasa	ATP
Quinasa de desoxitimidina	dCDP
DPN isocitrico deshidrogenasa (crasa)	Citrato
DPN isocitrico deshidrogenasa, (levadura)	AMP
Glucógeno sintetasa, (levadura)	G-6P
Glutamato deshidrogenasa	ADP, Leucina, Metionina
Acetil CoA-Carboxilasa	Citrato

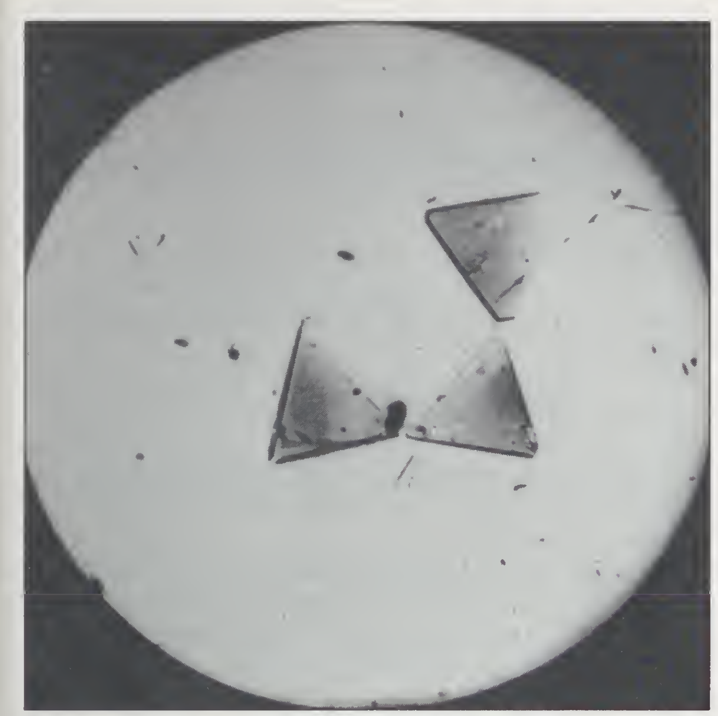


Fig. V. Cristales de desoxihemoglobina, (HBH) humana. Equivale al estadío T, (tenso) de una transición alostérica. Una vez se oxigene, pasará al estadio R, (relajado). Esta transición alostérica de la hemoglobina es uno de los mejores ejemplos biológicos sobre transición alostérica. (Cortesía del Dr. A. Rossi Fenelli, Roma).

que la fosforilasa b. Al convertirse la fosforilasa b en fosforilasa a, aumenta la oferta de receptores para el AMP c, decreciendo la afinidad por el ATP. Sagardía asume que la fosforilasa está compuesta por proteínas de unidades idénticas, unidas por enlaces covalentes.

Se ha encontrado que la conversión de la fosforilasa b en fosforilasa a se debe a la transferencia del grupo gama-fosforil del ATP a un residuo de serina en el locus 14, a partir del N-terminal, (5,6).

Se ha comprobado además, que el PM de la fosforilasa a es de 400,000 daltons y el de la fosforilasa b de 200,000 daltons. La fosforilasa b es un dímero de 100,000 daltons cada uno. Hemos visto ya que la activación de la fosforilasa b por el AMP c es antagonizada por el ATP, pero hay que recalcar que la glucosa 6-P tiene el mismo efecto antagónico. El Pi, (fosfato inorgánico), también influye en la activación de la fosforilasa b; no sólo está controlada por el AMP c.

Rosell Pérez encontró que un enlace covalente de fosfato produce cambios en las enzimas. Por ejemplo, la introducción de un P crea un incremento en la actividad de la fosforilasa y de la fosforilasa b-cinasa, (4).

La glucógeno fosforilasa y la glucógeno sintetasa se relacionan con la degradación y síntesis del glucógeno, respectivamente. Pues bien, la introducción de un P crea una disminución en la actividad de la glucógeno sintetasa y de la piruvato deshidrogenasa.

Cohen ha encontrado que la fosforilasa b quinasa tiene tres subunidades diferentes: las unidades alfa; las unidades beta y las gama. Las dos primeras son



Fig. VI. Cristales de oxihemoglobina, (HBO). Equivale al estadío R, (relajado) de una transición alostérica. Representa lo que ocurre cuando la hemoglobina se oxigena. (Cortesía del Dr. A. Rossi Fenelli, Roma).

unidades activadoras pero las unidades gama representan las unidades auto-catalíticas.

Resumiendo, las fosfatasas son una especie de agentes controladores del metabolismo celular, cuyo intrínseco modo de trabajar permanece en el misterio.

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Artículos Originales:

Síncope: Manejo Actual y Perspectivas Futuras en el Diagnóstico y Tratamiento

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Resumen: **Síncope frecuentemente presenta una enigma terapeútica y diagnóstica tanto para el paciente como su médico. El diagnóstico diferencial de síncope en el 1994 es muy superior al que estaba disponible en los años de 1980 - 1990. Un historial clínico detallado y examen físico minucioso son esenciales para la clasificación adecuada del paciente con síncope. Estudios electrofisiológicos, la prueba de la mesa inclinada y registros de larga duración componen la nueva tecnología disponible para clasificar la etiología del síncope de origen desconocido.**

Introducción

El síncope, definido como la pérdida de conocimiento súbita, transitoria y reversible debido a una alteración en el metabolismo cerebral ocurre de 25 a 30% en una población adulta.(1) Sobre 600,000 visitas al año a salas de emergencias y oficinas médicas por este motivo se han reportado en los Estados Unidos (2). No existen cifras sobre la prevalencia de este problema diagnóstico y terapéutico en Puerto Rico. Experiencias previas nos indican que es una situación clínica bastante frecuente. En 40% o más de pacientes evaluados por síncope, no se establece un diagnóstico preciso. El costo de las evaluaciones diagnósticas, incluyendo consultas con neurólogos, cardiólogos, endocrinólogos y siquiatras, puede exceder de $5,000 por caso (2). Más importante aún es la morbilidad de esta condición (laceraciones, contusiones, fracturas, hematomas, etc.) y el peligro potencial que representa para el paciente si el síncope es debido a arritmias cardíacas potencialmente malignas.

Durante los pasados diez años, la investigación clínica llevada a cabo en diferentes centros médicos, publicada en diferentes revistas médicas y presentadas en congresos mundiales, nos ha ayudado a entender la patofisiología de esta condición y las formas más efectivas de su diagnóstico y manejo.

Presentación de caso clínico

El caso que se presenta ilustra la evaluación en nuestro Instituto Cardiovascular de un paciente con síncope recurrente.

MG es una mujer de 25 años con historial de síncope recurrente de ocho años de duración. Estos ocurren en forma cíclica, usualmente precedidos por palpitaciones, sudores fríos, mareos, diaforesis y perdida transitoria del conocimiento. Su examen físico es esencialmente normal; los signos vitales en la entrevista inicial demuestran una presión arterial de 120/80, sin evidencia de hipotensión ortostática. La frecuencia cardíaca es de 80 por minutos y regular. No se detectaron soplos cardíacos o hallazgos cardiovasculares anormales. Fue evaluada previamente por el neurólogo quien recomendó un electroencefalograma y tomografía computarizada de la cabeza con y sin contraste. Estos estudios, al igual que resonancia magnética de la cabeza, CBC, SMA-23, T3, T4 fueron reportados como normales sin demostrar evidencia de hallazgos patológicos.

Al ocurrir el segundo y tercero episodio de síncope, fue referida al cardiólogo, quien en vista del historial de palpitaciones, ordenó un registro electrocardiográfico de 24 horas y un estudio ecocardiográfico bidimensional. No se encontró evidencia de problemas anatómicos cardiovasculares, ni alteraciones en el ritmo cardíaco. Su trazado electrocardiográfico al descanso, era normal con intervalos PR, complejo QRS y QT adecuados. Posteriormente, se le recomendó una tolerancia de azúcar de 5 horas que resultó normal.

Estudios diagnósticos especiales

En vista del historial previo, especialmente las palpitaciones que precedían al episodio de síncope, se le recomendó un estudio electrofisiológico cardíaco con el objetivo de evaluar el sistema de conducción e inducir arritmias cardíacas, específicamente, taquicardia supraventricular. Después de colocar catéteres bipolares y quadripolares en el atrio derecho, seno

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coronario y ventriculo derecho, se estimuló eléctricamente el corazón usando prematuros apareados atriales y ventriculares a frecuencia cardíacas de 100 y 110 latidos por minuto. Este proceso se repite después de una infusión de Isoproterenol para aumentar la frecuencia cardíaca de 20 a 30% sobre la frecuencia inicial.

Usando este protocolo de estimulación, no se logró inducir eléctricamente arritmias cardíacas. Su sistema de conducción, incluyendo los intervalo AH y HV, evaluación de la función del nodo atrioventricular y la conducción en el sistema His Purkinje fueron normales. Durante todo el estudio, la presión arterial se mantuvo normal. Sin embargo, al finalizar el mismo, la paciente desarrolló mareos, desvanecimiento y visión borrosa. En ese momento, la presión arterial disminuyó de 130/70 a 75/40 con una frecuencia cardíaca de 60-65 por minuto con ritmo sinusal. Se establece el diagnóstico de una reacción vasodepresora y se aceleró la infusión endovenosa de salina normal. Se elevaron las piernas y se administró Atropina por vía intravenosa. Sus síntomas desaparecieron minutos después de llevar a cabo la administración de Atropina. Se observó un aumento en la presión arterial y frecuencia cardíaca a 100/170 y 130 latidos por minuto respectivamente.

Veinticuatro horas más tarde, cuando la paciente se encontraba en su habitación, desarrolló un episodio de perdida de conocimiento, con presión arterial de 70/50 y frecuencia cardíaca de 60 latidos por minuto. En vista de estas observaciones clínicas, se confirmó el diagnóstico de una reacción vasodepresora de índole neurogénica y se recomendó llevar a cabo un estudio con la mesa inclinada **(head up tilt table test).**

Procedimiento con la mesa inclinada

Después de obtener consentimiento escrito, la paciente se acuesta en una mesa especialmente diseñada para que se pueda colocar en posición vertical o un ángulo de 60 a 80 grados de la horizontal. La paciente se para en un escalón especialmente diseñado para sostener a la paciente adecuadamente restringida. Su presión arterial y frecuencia cardíaca están siendo continuamente registradas en forma manual (cada tres minutos) o con Doppler arterial o a través de un catéter intraarterial conectado a una máquina de registro. Una infusión endovenosa de solución salina normal permite la administración inmediata de cualquier medicamento necesario. Si la paciente desarrolla síncope durante la posición vertical (60-80 grados de horizontal) la mesa se coloca en posición horizontal inmediatamente y se termina esta fase del estudio. Sin embargo, después de 30 minutos de posición vertical, nuestra paciente no desarrolló ningún síntoma ni cambio hemodinámico en su presión arterial y frecuencia cardíaca. Luego se empezó una infusión de Isoproterenol a una frecuencia de 1 mcg. por minuto por un período de 5 minutos con la paciente en posición horizontal.

Al cabo de 5 minutos, la mesa se colocó a 80 grados de la horizontal y 10 minutos más tarde, la paciente desarrolló mareos nuevamente. Su presión disminuyó a 70/50 y su frecuencia cardíaca se mantuvo en 100 lados por minuto.

Inmediatamente se puso la mesa en posición horizontal y la presión aumentó significativamente. Después de un período de 30 a 40 minutos, se le administró **Propranolol** intravenoso en dosis de 0.1 mgs por kilo (peso 115 libras) y se repitió la administración de Isoproterenol. Inmediatamente después de la infusión de Isoproterenol, la mesa se inclinó a 80 grados de la horizontal por 30 minutos. En esta ocasión, la paciente no desarrolló hipotensión ni ninguno de los síntomas antes descritos. En vista de estas observaciones, se le recomendó tomar 40 mgs de Propranolol tres veces al día por cuatro días. Al finalizar este período de tiempo, se le repitió la prueba de **"la mesa inclinada"** con infusión de Isoproterenol, sin lograr inducir mareos, síncope o hipotensión.

Al presente, nuestra paciente recibe Propranolol 120 LA una ves al día. Seis meses después de comenzar el tratamiento, se encuentra completamente asintomática, integrándose a su trabajo previo y programa de estudios universitarios. (Estudio se llevó a cabo en la Universidad de Miami).

Discusión: Clasificación de síncope

Los pacientes con síncope se deben subdividir en las siguientes categorías diagnósticas; (3)

I. Síncope de Origen Cardiovascular

II. Síncope de Origen no Cardiovascular

III. Síncope de Origen Desconocido

El síncope de origen cardiovascular a su vez se puede subdividir en el síncope cardiovascular reflejo (vasovagal, vasodepresor, síncope por hipersensitividad del seno carotídeo) y el síncope cardiaco. Los pacientes con síncope cardiovascular reflejo en su inmensa mayoría, no tienen enfermedad orgánica estructural significativa que contribuya a la patofisiología del síncope. El síncope cardíaco puede ser de origen obstructivo (estenosis aórtica, estenosis mitral, etc.) y el no obstructivo (o eléctrico) tal como sucede en arritmias, bloqueo atrioventricular, etc. Estos pacientes en su gran mayoría tienen enfermedad cardíaca estructural significativa. (Tablas l y 11).

El síncope no cardiovascular puede ser a su vez de origen neurológico, siquiátrico o metabólico.

Tabla I
Categorías Diagnósticas del Síncope

I. SINCOPE DE ORIGEN CARDIOVASCULAR

A. SINCOPE CARDIOVASCULAR REFLEJO

1. Vasovagal o vaso depresor también conocido como cardio inhibitorio.
2. Situacional (al orinar, tragar, toser, levantar pesas, después del ejercicio, evacuar, zambuir)
3. Ortostático-hiperadrenérgico (disminución de volumen) o hipoadrenérgico (insuficiencia automática)
4. Seno carotídeo hipersensitivo

B. SINCOPE CARDIOVASCULAR CARDIACO

1. OBSTRUCTIVO (MECANICO)

1. Estenosis aórtica
2. Estenosis hipertrófica sub-aórtica idiopática
3. Embolia pulmonar o hipertensión pulmonar
4. Mixoma atrial o estenosis mitral
5. Taponamiento cardíaco

2. NO OBSTRUCTIVO (ELECTRICO)

1. Bloqueo atrio ventricular
2. Síndrome del Nodo Sinusal Enfermo
3. Arritmias
4. Intervalo QT prolongado.
5. Relacionado a Marcapasos

Tabla II

II. SINCOPE NO CARDIOVASCULAR

A. NEUROLOGICO

1. Insuficiencia vertebrobasilar
2. Subclavian steal syndrome
3. Enfermedad de Takayasu
4. Hidrocéfalo con presión normal

B. METABOLICO

1. Hipoxia
2. Hipoglicemia
3. Hiperventilación

C. SIQUIATRICO

1. Desorden de pánico, depresión severa o histeria.

III. SINCOPE DE ORIGEN DESCONOCIDO

Estudios diagnósticos especiales en pacientes con síncope:

Entre los estudios diagnósticos disponibles para la evaluación del paciente con síncope, existen cuatro pruebas de gran utilidad para la evaluación del paciente cuyo examen físico, historial médico y estudios no invasivos no demuestran evidencia objetiva que nos ayude a encontrar y postular la etiología del síncope. (Tabla III)

Tabla III
Pruebas Diagnósticas para la Evaluación del Paciente con Síncope

- Historial y examen físico (lo más importante)
- CBC, SMA-23, radiografía de tórax
- Electrocardiograma de Holter, ecocardiograma y prueba de esfuerzo
- Rastreo electrocardiográfico de larga duración ("loop ECG recording")
- Estudio electrofisiológico
- Prueba de la mesa inclinada
- Evaluación siquiátrica

1. Estudio Electrofisiológico Intracavitario

La utilidad de estos estudios en la evaluación de pacientes con síncope recurrente de etiología desconocida se empezó a reportar desde 1981. A pesar de múltiples reportes de estudios no controlados donde se demostraba esta utilidad, las indicaciones específicas de estos estudios costosos en la evaluación de pacientes con síncope, no está claramente establecida. (2) Se conoce que el estudio es de gran utilidad;

A) En la evaluación de pacientes con taquicardia supraventricular y ventricular sostenida.

B) El estudio ayuda a seleccionar qué pacientes con síncope tienen arritmias ventriculares severas, peligrosas y potencialmente mortales.

C) El estudio puede ser de gran utilidad en pacientes con síncope y alto riesgo, tales como aquellos con enfermedad cardíaca estructural, especialmente con fracción de eyección disminuida (menos de 40%) y aquellos con latidos prematuros ventriculares multifocales repetitivos y taquicardia ventricular no sostenida en el electrocardiograma de superficie y en el estudio de Holter de 24 horas.

2. Rastreo Electrocardiográfico de Larga Duración ("Loop ECG Recording")

Aunque el registro ambulatorio electrocardiográfico de 24 horas (Holter) se ha usado para tratar de documentar o descartar arritmias (bradi o taquiarritmias) como causa de síncope, este estudio documenta la causa de arritmias en menos de 10% de los casos con síncope (4). "Loop recorders" (rastreo electrocardiográficos de larga duración) son usados por los pacientes por varios meses y provee un mecanismo para documentar la causa de arritmia del síncope en un por ciento mayor de los casos estudiados. Estas máquinas registran y borran continuamente cinco minutos del ritmo cardíaco. Un paciente que ha tenido el episodio de síncope puede oprimir el botón en la máquina después del síncope y preservar en

memoria el ritmo cardíaco durante cinco minutos previo al síncope. Este ritmo se puede obtener en un trazado electrocardiográfico o transmitir telefónicamente a una estación central para estudio y análisis. Esta prueba es de gran utilidad en pacientes con síncope frecuente (más de uno al mes), en pacientes con síncope sin enfermedad orgánica cardíaca y baja probabilidad de arritmias ventriculares malignas (fracción de expulsión de más de 40%). La sensitividad de estos sistemas en detectar y confirmar arritmias como factor biológico del síncope es de 25 a 30%, especialmente, bradiarritmias transitorias. Otro valor práctico del sistema consiste en demostrar al paciente y sus médicos la etiología no arrítmica del síncope (2).

3. **Evaluación Siquiátrica**

Los primeros estudios de síncope sugerían que la prevalencia de etiología siquiátrica de síncope era relativamente baja. Sin embargo, reportes recientes (2-4) han demostrado una prevalencia relativamente alta de desórdenes siquiátricos asociados al síncope. El síncope de origen psiquiátrico lo componen esencialmente desórdenes de pánico, depresiones severas, histeria o desórdenes de conversión. El mecanismo en estos casos es multi-factorial; hiperventilación y reacciones neurológicas vasovagales son los factores patofisiológicos más frecuentes.

4. **Prueba de la Mesa Inclinada (Head Up Tilt Table Test)**

Diferentes reportes recientes en la literatura médica han establecido y confirmado que la prueba de la mesa inclinada puede producir un síndrome de hipotensión-bradicardia neurogénica o neural que se parece mucho al síncope vasovagal. De igual forma, ha quedado establecido que esta prueba es de gran potencial con o sin la infusión de Isoproterenol en la evaluación de pacientes con síncope de origen desconocido. Esto quedó establecido cuando Grubb y su grupo (5) observaron una prevalencia alta de pruebas positivas en pacientes con síncope recurrente y una respuesta negativa de la prueba después del tratamiento adecuado para el síncope. Es de suma importancia tener conocimiento del reflejo *Bezol-Jarisch* para poder entender la forma en que la prueba de la mesa inclinada provoca la perdida de conocimiento y síncope. Se ha postulado que este reflejo es el mecanismo responsable de provocar e inducir hipotensión y/o bradicardia durante la prueba.

Mecanismo de Síncope:

Al pararse el paciente por 30 minutos, se reduce el retorno venoso al corazón. Esto provoca una pequeña, pero, significativa reducción de la presión sistólica que a su vez causa un aumento en el nivel de catecolaminas circulante en la sangre. La disminución en el retorno venoso y la disminución del débito cardíaco junto con el aumento de las catecolaminas en la sangre hacen que aumente exageradamente la contractilidad del ventrículo izquierdo.

Estas contracciones vigorosas inician un reflejo a través de mecano-receptores vagales intracardíacos. (Reflejo de Bezol Jarisch) Los mecano receptores envían impulsos a través de fibras aferentes que establecen sinapsis en el tallo cerebral con fibras vagales eferentes. Estas fibras vagales eferentes envían impulsos que disminuyen el ritmo cardíaco y provocan vasodilatación periférica. Esto resulta en hipotensión severa y síncope en algunos pacientes susceptibles.

Tratamiento de Síncope de Origen Neurogénico:

Existen cuatro tipos de medicamentos potencialmente útiles para bloquear este arco reflejo;

1. Beta Bloqueadores, estos disminuyen la respuesta al aumento de catecolaminas endógenas o administradas por vía endovenosa.

2. Escopalamina, bloquea el estímulo vagal eferente que causa bradicardia y/o dilatación periférica.

3. Disopiramida (Norpace), este agente antiarrítmico disminuye la contractilidad del ventrículo izquierdo disminuyendo la estimulación a los mecano-receptores intracardíacos. Además provee efectos anticolinégicos.

4. Hidrofluorocortisona, aumenta el volumen intravascular y evita la producción del ventrículo pequeño hipercontractil.

El estudio electrofisiológico o la prueba de la mesa inclinada, ¿cuál es más costo efectivo?

Existen varias interrogantes relacionadas a la prueba de la mesa inclinada; en qué pacientes está indicada?, son las respuestas reproducibles?, en cuántos pacientes sin síncope es la prueba positiva? (falso positivo). Las contestaciones a algunas de estas preguntas todavía no están disponibles, sin embargo, el reporte reciente de Jasbin y su grupo, (1) demuestra que en pacientes con síncope, aquellos que tienen estudios electrofisiológicos positivos (se le induce taquicardia ventricular monomórfica sostenida), 76% tienen enfermedad estructural del corazón. En aquellos otros pacientes con síncope y estudios electrofisiológicos negativos (no se induce taquicardia ventricular monomórfica sostenida), solamente el 6% tienen enfermedad orgánica del corazón.

En los pacientes con síncope y estudios electrofisiológicos negativos se puede reproducir el síncope en 40% de ellos con la mesa inclinada. En estos, el tratamiento con beta-bloqueadores normaliza la prueba previamente positiva.

Este es un estudio de gran importancia clínica que sugiere que en pacientes con enfermedad orgánica y síncope, el estudio electrofisiológico es más costo

efectivo, mientras que el paciente sin enfermedad orgánica y síncope recurrente, la prueba de la mesa es la más indicada y costo efectiva.

Experiencias personales durante los últimos diez años, indican que este último grupo son pacientes más jóvenes donde predomina más frecuentemente el sexo femenino.

Se han establecido Programas de Evaluación de Síncope. Estos programas tienen todas las pruebas disponibles para el diagnóstico y tratamiento de pacientes con síncope recurrentes de etiología desconocida.

Summary: **Syncope represents a diagnostic challenge and therapeutic dilema both to the patient and to the physician. The work up for syncope in 1994 is far superior to the one available in the 1980's. An adequate clinical history and physical examination are essential for the proper classification of syncope. Electrophysiologic studies, tilt table tests and loop recorders are the new technology available to clarify the etiology of syncope of unknown origin.**

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Artículos Originales:

Cardiac Pacemaker Tachycardias - Part II

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Summary: **This work addresses, discusses and reviews the many types of tachycardias associated with cardiac pacemakers, with which the modern physician may be confronted. Emphasis is laid upon the differential diagnostic aspects of these complex tachyarrhythmias for today´s practicing physicians, since accurate diagnosis is the keystone for a proper approach to management. A didactic approach and departure is assumed in an effort to organize, outline and simplify to the extent possible, a vast, inundating complex field of medicine.**

Key Words: *Pacemakers; Cardiac Pacing; Tachycardias.*

Part II

30. **Dual Chamber Pacemaker Upper Rate (UR) Responses**

May enter the differential diagnosis of PMT's.They are activated when the patient's spontaneous atrial rate (AR) exceeds the URL of the pacemaker, and they ordinarily protect the patient from rapid heart rates, defining the fastest P rate that can be sensed, while attempting to maintain AV synchrony; they prevent a VR faster than the programmed UR (pUR), or the TARI.

A. Set by the Total Atrial RP (TARP) or Interval (TARI). The Maximal Tracking Rate (MTR) resides in the atrial circuit. 1- Spike.

AV Block Response (Multiblock Response, Fixed ratio & Sudden Block; 2:1, etc. TARI-dependent; Technical ARP. TARI >= URI. TARI > sinus cycle length).

TARI = AVI (AVD) + PVARP. PVARP = Post ventricular ARP.

$$\text{URL/Block rate (bpm)} = \frac{60{,}000}{\text{TARI (TARP)}}$$

B. Set by the URI, independently of TARI, by a separate ventricular-based URL timer; MTR timing resides in the ventricular circuit. 1-Spike. Physician programmed.

Electronic Pseudo-Wenckebach Response

URI > TARI (TARI shorter than the pURI, the pUR lower than the TARI rate; TARI < sinus cycle length).

Wenckebach prolongation (AVI Extension). Wenckebach Interval (WI) = URI - TARI (TARP).

X. Fallback Response - gradually decrements the VR to a programmed lower fallback rate, either without AV synchrony (VVI) or with AV synchrony, limiting the time the VR remains at the UR. 1-Spike.

Y. Rate Smoothing - provides a progressive percentage change (3-24%) in the cardac paced rate from one cycle to the next, avoiding abrupt rate fluctuations. May see both A & V spikes; sometimes the A may not capture if it occurs in the atrial MRP (AMRP) engendered by a preceding P wave. 1 or 2 Spikes.

Z. Combinations of the above. Fallback and Rate Smoothing can result in reentrant and PMTs. (4,10-14,18,20,29,67,88,101-106).

31. **Rapid Paced Ventricular Rates in DDD and VDD Pacing Systems** (ELT, CMT, Pacemaker RT).

ELT, a near-field tachycardia, although once very common occurring in up to 50% of certain first generation dual chamber pacemakers with short fixed PVARP's of 150-200 ms, is infrequently encountered today in modern pacmaker practice.

Requirements: an intact antegrade and retrograde limb; intact VAC > PVARP; atrial sensing and ventricular pacing.

Pathogenesis: a form of V-A synchrony; ELT = an antidromic, reentrant dual chamber PT. The atrial channel senses outside its RP a retrograde atrial depolarization via intact VAC over the heart's natural nodal pathway, which then triggers the next ventricular output and paced beat via the pacemaker which acts as an artificial bypass AP, at the end of the AVI or the URLI; a retrograde P' follows the ventricular paced beat. This process is pertuated: atrial sensing- ventricular pacing, to produce and sustain a macroreentry loop. It persists until there is loss of VAC (fatigue, refractoriness) or loss of atrial sensing of the retrograde atrial impulse.

Intact VAC exists in about one-third of cases of AV block, and in about three-fourths of SSS patients (about one-half or more of all pacemaker patients). VAC Times range from 100 to 500 ms. averaging 240-255 ms.

ELT is a ventricular V-paced only, wide regular tachycardia at, near or below the URL. Each ventricular beat is paced by a V stimulus and there are no atrial

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stimuli present. The UR of ELT is defined by and depends upon the pURL, the programmed antegrade AVD + retrograde VACT (the sum of the antegrade and retrograde conduction times). The absence of retrograde conduction excludes ELT. However, the retrograde P' may or may not be evident, often fusing with and invisible in the T wave- a "Retrograde Tachycardia".

ELT has been classically linked to pacemakers that sense atrial signals: mainly DDD, VDD and DDD-R systems (4, 6-8, 11, 13-15, 17-21, 24, 29, 31, 87, 90, 92, 98, 104, 106-117, 117a, 117b).

32. Table I addresses the **Diagnostic Methods** applicable to **PMT's.**

33. Table II lists **Causes of Pacemaker ELT.**

Table I. Diagnostic Methods of PMT's

1. Learn the program. Verify URL, LR, AVD. Measure all intervals. Mark A & V. Determine the regularity, onset. Measure from a S backwards. ECG calipers, trividers.
2. Evaluate for VAC and the VACT.
3. ECG. Holter. Simultaneous endocardial EGM and surface ECG.
4. Event Timing Markers. Marker Channel. Telemetry. Atrial, ventricular EGMs. P, p, f, QRS waves, for interpretation of events.
5. Exercise testing, Treadmill; to induce a Wenckebach response or myopotential triggering.
6. Event counter/recorder; Pacemaker data bank; TTA.
7. Application & removal magnet. Inhibit the device; unveils the native rhythm for analysis of P waves; a slower DOO and VOO mode.
8. Program to triggered modes - DDT, AAT.
9. Program to VVI mode, at a slower rate, or to another mode; shorten and lengthen the AVI; increase the UR and the PVARP - to analyze atrial activity.
10. Provocation of pectoral muscle exercise for myopotential triggering: Isometrics, Interference/EMI.
11. CWS - disturbs atrial sensing.
12. Provoke PMT - by programming a subthreshold stimulus of atrial output, increase atial sensitivity, and the UR faster than junctional rate, shorten the PVARP; program LR above spontaneous rate; create AV dissociation.
13. Perform special leads - SP5 for precordial chest lead amplification.
14. Automatic ventricular Stimulation Threshold testing, to see the SVT after loss of ventricular capture. Sensing Threshold testing - analysis of SVT.
15. Chest Thumb. CSM.
16. Esophageal ECG.
17. Retrograde atrial conduction - Telemetry, AEGM, Event Marker; AAT mode while pacing ventricle.
18. Check UR settings - set the UR to the lowest settings and exercise patient-to produce Wenckebach.
19. Use a metabolic sensor.
20. If the paced ventricular complexes always exceed the LRL and are not preceded by an A stimulus, then an electrical event must have been sensed by the atrial amplifier and interpreted as a P wave (a true P, f or extracardiac signal) to trigger a ventricular output after a pAVD.
21. Clinical suspicion - palpitations, congestive heart failure, worsening angina, dizziness, syncope, Pacemaker Syndrome, etc.

Ref. 5, 7, 25, 118-124.

Table II. Causes of Pacemaker ELT

Any state causing AV dissociation/disruption of AV synchrony, with separation/displacement of the P wave away from its natural position before the QRS complex, plus the presence of retrograde VAC, plus sensing of the retrograde impulse by the atrial channel.

1. VE/VPB, with rVAC - the most common cause; a chest thump causing a VE.
2. APB, with prolonged AV conduction. JPB.
3. Atrial Reciprocal/Echo Beat (RB).
4. Failure of atrial stimulus to capture + Ventricular Escape pacing with rVAC. Apparent failure of atrial capture due to rVAC causing atrial refractoriness.
5. Atrial undersensing, of the P wave + retention of P' wave sensing. Atrial undersensing + VBP undersensing, especially with a short MBP.
6. Application of Magnet; Withdrawal of Magnet. Reprogramming, to another mode.
7. Myopotential or EMI oversensing by atrial channel. Environmental Noise/Interference. Reversion from the Noise mode. Atrial Lead Oversensing.
8. An inappropriately prolonged pAVD, which predisposes to rVAC, since atria have time to recover from refractoriness.
9. Pacemaker Escape Rate (ER) higher than the Atrial Rate (AR). VDD: AR < LR, causing AV dissociation and a VVI escape.
10. Post-temporary inhibition, with subsequent ventricular escape with rVAC.
11. Wenckebach UR response, with P- V interval lengthening, favors interruption of AV synchrony & rVAC. Exercise, TMT leading to Wenckebach UR response. A prolonged WI. A low URL mandating a Wenckebach UR response.
12. a. Fallback UR response, interrupting AV synchrony - Irregular PMT.
    b. Rate Smoothing UR response, interrupting AV synchrony - regular PMT.
13. Along VBP, leading to BP undersensing.
14. Chest Wall Stimulation (CWS): separating P from paced QRS, if selectively sensed by atrial channel.
15. Pacesetter AFP behavior with "Magnet Off", on application of magnet or programmer head. Symbos programming of "Cancel Magnet".
16. Atrial Oversensing/ Far-Field Sensing ELT.
17. A short PVARP.
18. An excessively long PVARP.
19. Designs to prevent VPB-induced ELT:
    a. Automatic extension of PVARP after a VPB, and
    b. DDX mode - to DVI mode with atrial nonsensing, promoting rVAC. An A delivery during the atrial VP can result in atrial arrhythmias, including Af.
    c. AV Disable (Bigeminy Protection) mechanism - the ventricular paced beat terminates a cycle without a preceding atrial depolarization (Versatrax 7000).
    d. SAS design on detection of a VPB.
20. Spontaneous ELT, without identifiable cause; may follow a spontaneous or paced P wave, followed by a conducted or paced QRS, or may follow an AV sequential paced beat.
21. Two initiating mechanisms may coexist and alternate, and the initiating mechanism may differ from the sustaining mechanism.

Limit ELT:
a. a prolonged TARP;
b. a low URI resulting from atrial refractoriness;
c. block UR mechanism;
d. selective atrial sensing;
e. uncoupling of V-A synchrony (CWS, an early myopotential, omission of a single V stimulus).

Ref. 4,6,7,10,17,63,87,92,104,105,112-114,116,117,125-132.

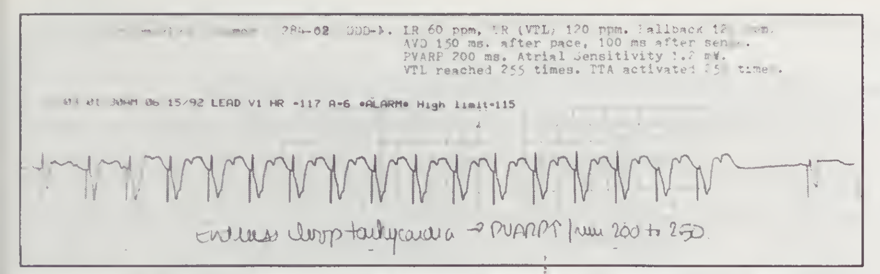


Fig. 1. CAD, HBP, DM. Complete AV block. PMT ELT at the pUR of 120 ppm. Precipitant? APB with a long AVI; TTA terminates, ending with a rP' wave and a pause of 935 ms (URLI + AEI). (Courtesy: Fajardo Regional Hospital).

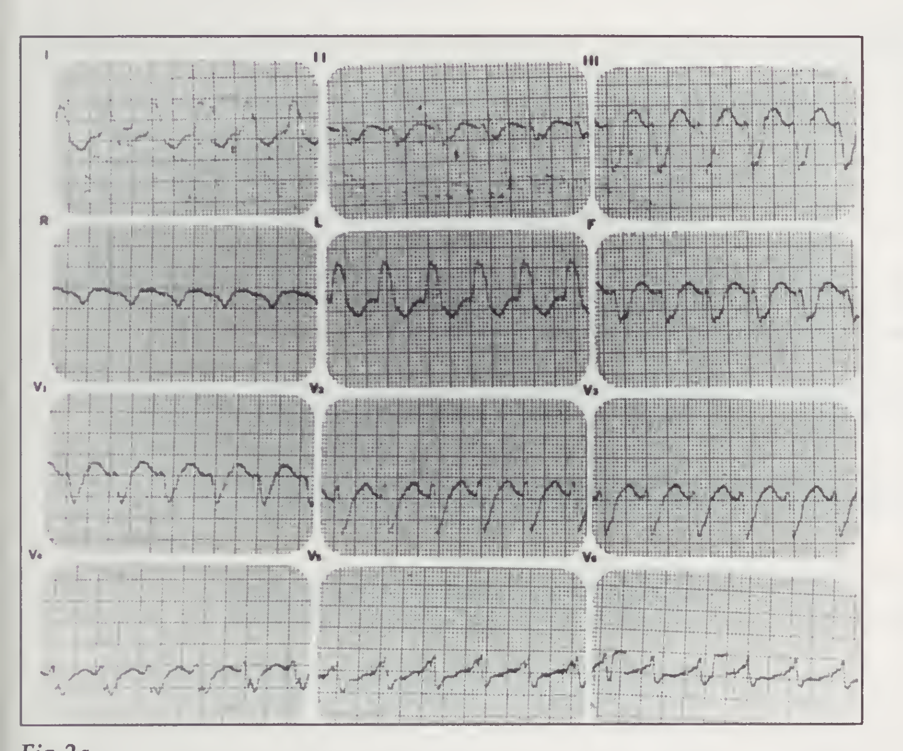


Fig. 2a

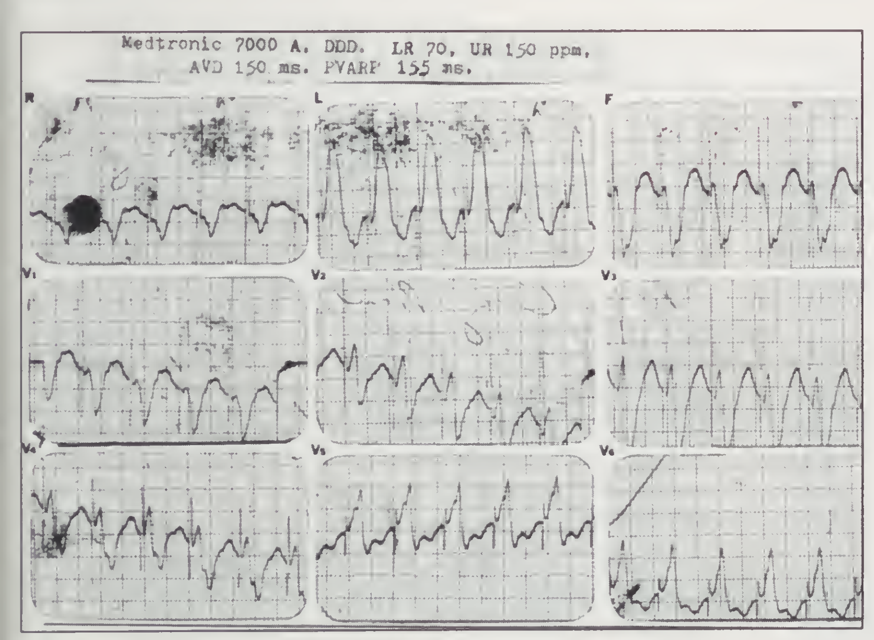


Fig. 2b

Fig. 2. A & B. SSS, Myotonic Muscular Dystrophy. Balanced ELT (BELT), rate 134 ppm. Failure of atrial sensing & capture (nonillustrated).

34. Differential Diagnosis

ELT has represented the major, popular pacemaker-related tachycardia. The diagnosis has been presented as being simple when facilitated by telemetry of event markers and EMG's (6). However, ELT has offered the greatest diagnostic, intimidating challenge and difficulty when only a surface ECG or Holter ECG study (often with a poor or no diary) are available for analysis to the interpreter, especially when the P waves are invisible, instead of the patient with the PT! Specifically, the differential diagnosis of a tracked sinus tachycardia (ST) versus ELT has offered the greatest dilemma. Indeed, tracked primary SVT's may present a similar visual appearance as ELT (7, 17, 104, 116, 117, 122, 132-134).

Tables III and IV provide differential diagnostic aids and clues for this venture. Figures 1 - 16.

Table III.
Spikes (Stimulus Artifact) in PMT´s

No Spikes

1. Native, intrinsic tachycardia, with pacemaker inhibition. VT.
2. PIT

One Spike

1. Pacemaker Runaway Tachycardia.
2. Pacemaker Fixed-Block UR response
   Pacemaker Wenckebach UR response
   Fallback UR response
   Rate Smoothing UR response (or 2-spikes).
3. Tracking of SVT's
4. ELT
5. Atrial Oversensing PMT's
   Myopotential Drive
   EMI
6. Far-Field Atrial Oversensing
7. Triggered Tachycardias
8. Orthodromic ELT (1 atrial spike).
9. Cross-Talk PMT (or 2 spikes).

Two Spikes

1. Rate Smoothing UR response (or 1 spike).
2. AVDA - Repetitive Nonreentrant V-A Synchrony.
3. Cross-Talk PMT's (or 1 spike).
4. Autonomous Pacemaker Tachycardia (APT).

Table IV. The Differential Diagnosis of Sinus Tachycardia and Primary SVT's from ELT.

ST - Primary SVT's with conduction via Pacemaker System	PMT - ELT
Symptoms: UR responses may cause symptoms.	Palpitations, increasing angina, congestive heart failure, syncope.
Onset & Offset: Gradual. Pathologic AT, AF, Af- erratic and sudden rate increases.	Sudden, paroxysmal.
Initiation: Spontaneous, APB.	Table III, causes of ELT, VPB, etc.
Rate: Any rate; AR slower, same or faster than UR; not exact. VR between the LR & UR. P - P $\gtrless$ URL. QRS-S = URLI. If AR faster than UR, see Wenckebach or block response. If AR slower than UR, see a slower sustained paced VR. Can be sustained below URL.	At the exact URL usually, but infrequently can be less, called BELT (if VAC is prolonged and retrograde conduction is maintained at rapid rates). Rate < pURL by 2-88 bpm; as low as 60, 87, 100 bpm. Never faster than the UR. BELT- cycle length: VAI + AVI > MTR. Usually prompt termination when forced to be sustained at a lower rate.
Rate not a good differential criterion for detection and characterization.	
Regularity: Atrial P rhythm/S-S interval/ QRS-S interval slightly irregular and varies from beat to beat by at least 5-10 ms. Irregular PMT- Af, AF, AT, myopotential, false signal.	Absolutely regular. S-S interval/QRS-S interval regular. May be irregular with myopotential or false signal triggering. A progressive increase of the S-S interval is probably due to a V-A Wenckebach phenomenon.
Pacemaker Wenckebach: R - R cycle regular.	ELT - Fallback causes a gradual lengthening of the URI.
P wave: A similar sinus/ectopic antegrade P wave precedes a paced QRS beat (it may not be visible when buried in T wave or QRS complex).	Retrograde P' wave, negative in L. II, III, aVF (may or may not be visible, may deform the ST segment).
Differences in amplitude and morphology by EGM.	
AVI: When AR faster than UR, there is a Wenckebach response followed by a pause, or a 2: 1 Block response. Combination of group beating at URL with pauses in which a visible P is followed by a paced ventricular beat. Two intervals are observed - a. repeated ventricular pacing at URL, and b. a longer interval following the undetected P wave. Wenckebach - group beating, progressive lengthening of PV interval and intermittent pause. Appearance of AV dissociation since P' s march through ventricular cycle, but there is a definite link between each P and its triggered V. Programming the UR down may produce Wenckebach operation and clarify the tachycardia. A higher pUR will avoid Wenckebach behavior. If AR = URI, the AVI is as programmed. If AR < UR, no P-V interval prolongation occurs (since the AR is sustained on a basis other than pacemaker mediated reentry). A Fallback or Rate Smoothing operation may occur resulting in increases in the S-S interval.	No Wenckebach nor Fixed Block response at the UR. No pauses. R-P' and P' R intervals stable. If rate is exactly at the UR the AVI is prolonged. If < URL the P' -V/AVI is prolonged in order to sustain the PMT (since it is based on VAC with a need to allow the conduction pathway to recover so that it can conduct retrogradely again). BELT - the AVI = pVAD and is not extended. The VPI is relatively long. Sustained pacing at exactly the UR for some period of time; tends to be incessant, but can be brief and non-sustained. The VAI may progressively prolong from fatigue of the pathway until the P' is not conducted and the PMT terminates. At the UR, there may be an algorithm break with dropping of the 16th beat, a Fallback or Rate Smoothing response, etc. ST with a pacemaker Wenckebach response during exercise may induce an ELT.

(Continúa en la pág. 99)

Table IV. The Differential Diagnosis of Sinus Tachycardia and Primary SVT's from ELT.

Termination: A P wave falls in the PVARP and is unsensed.	TTA- after 15 cycles at the URL the TTA omits the 16th ventricular stimulus and ends with a P' wave, or 6 cycles.
Pause: Wenckebach, maximal duration = P-P interval + pAVD + PVARP. = LRI if there is no P before end of AEI. Cosmos = Extended AEI (AEI + 300 or 400 ms). ST broken by TTA = URI + AEI.	TTA (Cosmos) = URLI + AEI, or the AEI extension. Can be shorter if a sensed P wave triggers a V stimulus. Cosmos TTA + Fallback - gradual lengthening of the URI and gradual slowing occur.
Constancy of V_P to A_S: No	Yes. VAC and PMT may be present.
Irregular VA Interval: Yes	No.
Spontaneous SVT's present at other times: Yes	No.
Magnet: SVT's cease but will resume on magnet removal.	PMT usually ceases, with asynchronous pacing; antegrade limb.
CSM: May terminate or slow ventricular response, or may not respond.	Refractory, or terminates in the retrograde limb, directly.
CWS: The ventricular channel may inhibit its output on sensing.	Terminates, by affecting ventricular or atrial sensing. The ventricular channel on sensing, inhibits, and uncouples V-A synchrony; via VAC.
Cardiac glycoside, B-blocker, Ca-blocker, Lidocaine, Cardioversion Effect: Yes	Refractory, or occasionally terminates in the retrograde limb, directly.
VE' s, Chest Thumb, Myopotential oversensing: No effect.	Usually terminates, via VAC.
Lenghthening PVARP: slows ventricular response; persists.	Disappears.
Re-programming to VVI, DVI mode, decreasing atrial sensitivity: slows ventricular response.	ELT disappears. Suggested if patient's symptoms disappear.
Automatic TTA: the TTA may be activated at the MTR and terminate certain SVT' s, including ST, if the rate is the same as the MTR, if the rhythm is stable and continous with 1: 1 association.	The automatic TTA is activated and terminates, by inhibiting the delivery of a single V output, but the TTA may not recognize a BELT. The number of times that the Event Marker shows that the MTR has been reached will not differentiate.
Methods to Induce VAC:	Induction of a similar tachycardia.
Atrial Signal Discrimination: Antegrade.	Retrograde.
Marker Channel / EGM: VAI irregular. Tachycardia not due to retrograde conduction and ELT.	Retrograde conduction consistent. V_P to A_S constant.

A. Rate /QRS-S interval between the LRLI and the URLI, or at the URLI.
A P wave precedes each spike

Atrial Lead Sensing: Rapid, no sudden onset, relatively regular. ST, AT, SVT' s.	Rapid, usually regular, onset sudden following a VPB, etc, or a ventricular spike. ELT. PMT.

(Continúa en la pág. 100)

Table IV. The Differential Diagnosis of Sinus Tachycardia and Primary SVT's from ELT.

P-P interval < URLI and the QRS-S interval at the URLI means a pacemaker Wenckebach response at the UR.

No P wave precedes each Spike, at the AVI

Atrial Lead Oversensing PMT:
S-S interval irregular (atrial lead oversensing at a variable time in the cardiac cycle) as a rapid, very irregular ventricular paced interval (such as oversensing EMI), or the S-S interval regular (oversenses at the same time in cardiac cycle).

B. QRS-S interval less than the URLI/ the paced rate faster than the URL.
The preceding native QRS complex occurred while the pacemaker was in its own VRP (uncertain sensing).
Ventricular Lead Undersensing.

Pacemaker recognition/ detection, automatic

	SVT		PMT - ELT
A.	1. Discrimination of sinus tachycardia from a pathologic atrial tachycardia.		Suspect ELT if V_P to A_S < 450 ms.
	2. Antegrade P wave		Retrograde P wave.
	3. Sustained V_P - A_S near the UR	No	Yes
	4. Stability of retrograde conduction	No	Yes (< 31 ms. when V_P - $A_S \leq$ 450 ms. for 8 beats).
	5. AVD Modulation (ELA Chorus pacemaker; physician)		
	Nonconstant VAI/VPI/R-P'/QRS-P' interval/ V_P - A_S		Constant VAI/VPI/R-P'/V_P - A_S.
	Decrease AVD: A corresponding increase in VPI/ V_P - A_S		Stable VPI / V_P - A_S.
	Ventricular pacing rate: Remains unchanged?		Alteration - if decrease the AVI by 47 ms. the V-V interval is abbreviated by 47 ms.

B. A Metabolic Indicated Rate Interval (MIR). A "Smart pacemaker".
A metabolic sensor reflecting metabolic need, such as activity or temperature, to determine and judge the appropriateness of a rapid atrial rate, and compare it with the Sensor-indicated rate.
A physiologic tachycardia rate versus a pathologic tachycardia.

Rapid rate: a smooth increment in the native AR.		Sudden, erratic.
Metabolic need-	(Relay)	
Body activity,		
motion excercise	Present	Absent metabolic need, Inappropriate, Inactivity.
emotions	Appropriate	Same with AT, myopotentials.

"Conditional Ventricular Tracking Limit" (CVTL) -(Intermedics Relay DDDR, Pacesetters' Paragon II, Circadian). Sensor to validate the appropriateness of a rapid atrial rate. If in the absence of patient activity/metabolic need the sensed atrial rate exceeds the CVTL, the ventricular pacing response becomes limited to a value equal to 35 ppm above LR but not less than 80 ppm.
The Teletronics META DDDR system considers a rapid rate/SVT as nonphysiologic (AT, Af, AF) when the P-P interval is less than the TARP, and it automatically changes to the VVIR mode. et. al.
An ELT may be terminated by a pacemaker algorithm that automatically extends the PVARP or shortens the AVI for one cycle.

References 3-10,13,30,31,69,88,90,104,108,111-117,132-142.

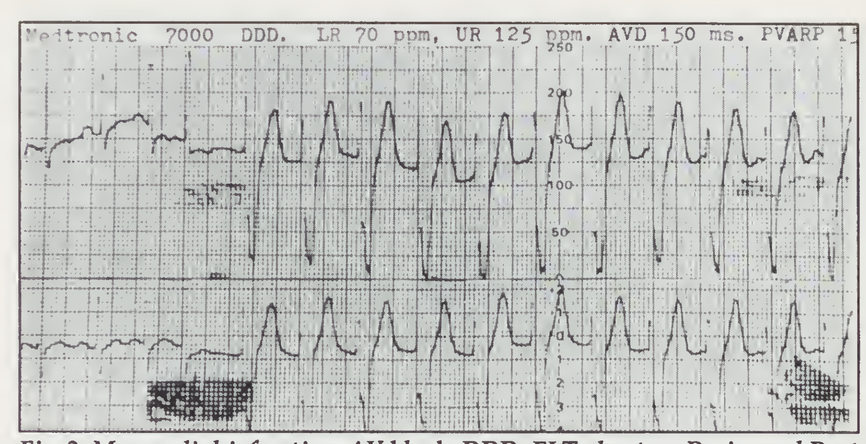


Fig. 3. Myocardial infarction. AV block. DDD. ELT, due to a Reciprocal Beat (Echo Beat) of Atrial origin, rate 122 ppm. VP' = 320 ms, P'V = 160 ms. (From: PACE 7: 29, 1984, with permission, Ref. 126).

35. **Pseudo-ELT**

A ST approaching the URL following a 3-beat ventricular arrhythmia whose rate approached the URL; regular sinus P waves continued at their own rate but were indiscernible (no rP' waves); caused by a combination of interference by a VPB of the regular sequence of normally conducted ventricualr complexes and the pacemaker committment to maintain an URL by prolonging the artificial AVI and absence of retrograde conduction from the ES (140). Figs. 11, 12.

36. **Ventricular Tachycardia.** No Spike.

A PMT may be misdiagnosed as VT. PMT may be refractory to CSM, cardiac glycosides, lidocaine, B-blockers and cardioversion, and is accompanied, in distinction to VT, by V spikes. VPBs might mimic a burst of ELT.

37. **Magnet Application over a PG. Magnet or Programmer Withdrawal.**

Programming **Mode Change. Reversion** from the **Noise Mode.**

a. The PG detects retrograde atrial activation from the V paced or EB, or AV dissociation with wide separation of the Ps and QRSs, triggering a V output - on restoration of sensing back to VDD/DDD mode, shift from asynchronous to synchronous; on restoring sensing from "Cancel magnet" (63,127).

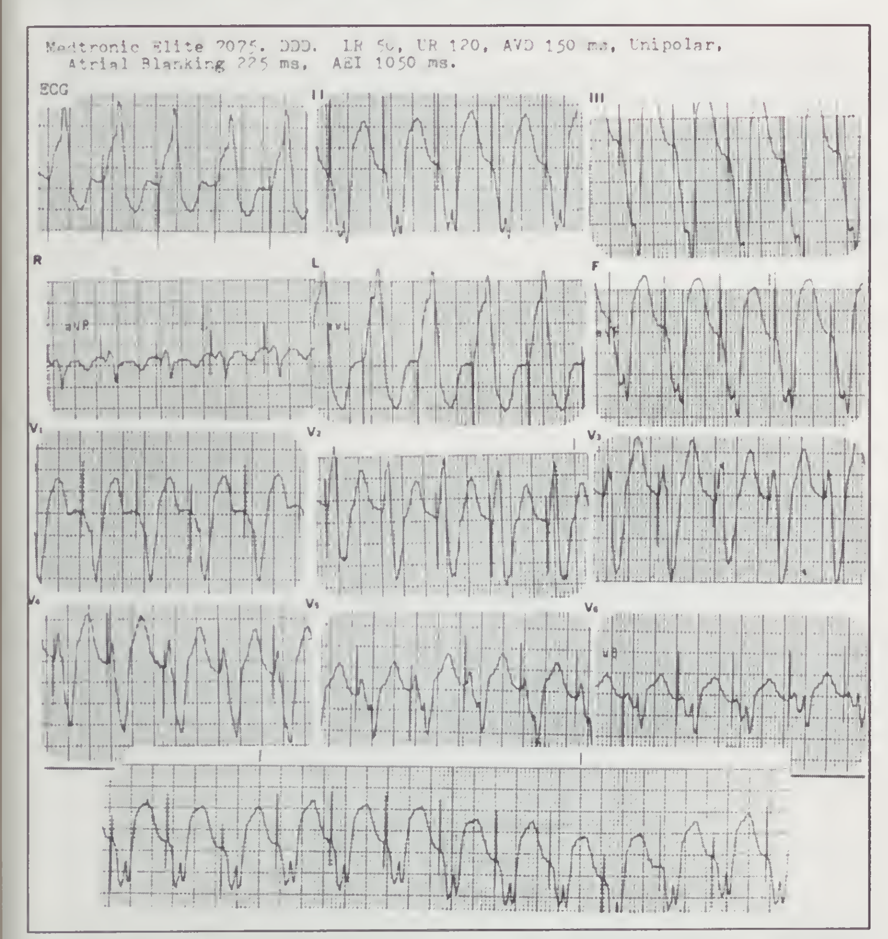


Fig. 4. CAD, MI's, HBP, CHF, LBBB. Medtronic Elite. BELT is likely; rate 115-118 ppm.

b. Magnet application/waving/removal, over a Pacesetter AFP DDD generator in the "Magnet Off" function, due to magnet or programmer head-induced voltage signals (reed switch opening & closing) sensed by the atrial channel circuitry, resulting in the premature delivery of the V after the AVI, initiating an ELT. Treatment was to place in the "Magnet Off" position, or use CSM or drugs to abolish the VAC (116,127,128).

c. Magnet application over a Medtronic Symbios unit may result in omission of an atrial stimulus, with retrograde VAC, and an AVDA; withdrawal of the magnet may then lead to ELT;

d. Magnet DOO with atrial noncapture.

38. **"Magnet-Unresponsive" ELT' s**

a. Inadvertent programming to "Magnet Off" operation.
b. Insufficient magnetic field when the magnet is over the PG - obesity.
c. **Repetitive Non-Reentrant Ventriculoatrial Synchrony.**
AV Desynchronization Arrhytmia (AVDA).

A 2-spike A and V PMT, the A stimulus being ineffective, which can occur in DDD and DDD-R pacing, but not in the VDD mode. The rate may not be rapid, being less than the pURL. This represents another form of VA synchrony, that is unassociated with sensing of retrograde P', and that may explain an important form of "magnet-unresponsive" ELT's.

A paced ventricular beat produces an unsensed retrograde P wave falling within the PVARP or in the magnet DOO mode; an ineffectual A stimulus is emitted at the

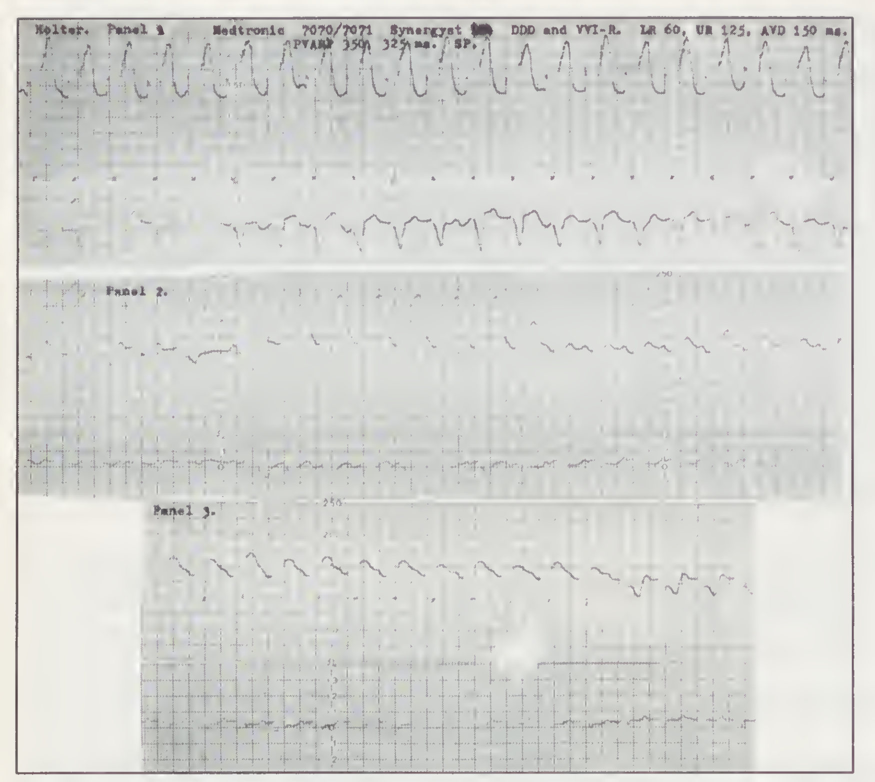


Fig. 5. Dilated Cardiomyopathy. High-degree AV block. DDD & VVIR. Panel 1 - atrial synchronous (P triggered) pacing; tracking of a regular ST, 118 ppm, below the pUR. Panel 2 - native ST, tracking. Panel 3 - atrial synchronous pacing on left, spontaneous ST on right.

completion of the AEI in the AMRP of the rP′ wave. A continual repetitive, self-perpetuating process ensues. The P wave cannot be replaced into its physiologic position. AVDA has similar aspects as ELT, one may convert spontaneously to the other. Magnet application to stop ELT may result in AVDA, and on magnet removal ELT may recur. In addition to a magnet, AVDA may result from programming, loss of atrial capture, a VE with retrograde atrial depolarization, and in DDD-R pacing during exercise (the sensor-driven increase in pacing rate shortens the AEI). It is favored by: loss of atrial capture, a long rVACT, a rapid LR or sensor-driven rate, a prolonged AVI so that the AEI is brief, a long PVARP, an AEI < VACT + the Effective RP (ERP) and a post-VPB PVARP extension. Repetitive Nonreentrant VA Synchrony may terminate spontaneously or be terminated by: CSM (increases or blocks VAC), the TTA, CWS (selective atrial channel sensing with inhibition of the ventricular channel), provocation of myopotentials or an early ES which disrupt VA synchrony, and by programming a short PVARP, a longer AEI, a lower LR, single chamber pacing, and a shorter AVI which displaces the atrial stimulus away from the preceding P′ wave and restores AV synchrony by producing atrial capture beyond the AMRP. (6, 7, 30, 116, 117, 138, 143, 144, 144a). Fig. 14.

39. Environmental Interference, False Signal Oversensing by the Atrial Lead.

A. Endogenous Origin

a. defective unipolar atrial lead, loose electrode, artifacts, via AV dissociation and retrograde VAC (rVAC).
   Dx: Event Marker, EGM, ECG - irregular, chaotic paced VT. D. Dx.: Af.

b. **Myopotential Triggering / Drive. Atrial Lead Oversensing.** One Spike.

This may result in palpitations and an irregular PMT. The atrial channel inappropriately oversenses and tracks the high-frequency myopotentials (pectoral, diaphragmatic, rectus abdominus muscles) and triggers ventricular pacing outputs, irregularly (no rP′ waves) at rapid rates; or a regular true ELT may occur if there is retrograde atrial depolarization. The tachycardia is often at the URL. A PMT due to myopotential triggering may also be associated with: ventricular channel myopotential inhibition (and EB's with rVAC), mixed alternating triggering and ventricular inhibition, a single missed stimulus, abbreviation of the AVI to 100-110 ms if myopotential sensing by the ventricular electrode occurs within the VSP/NPAVD period, reversion to the interference/Noise mode with asynchronous DOO pacing for one or more cycles, leading to Vf and tachyarrythmias. VT could result from a bradycardia-dependent mechanism, from rapid burst pacing

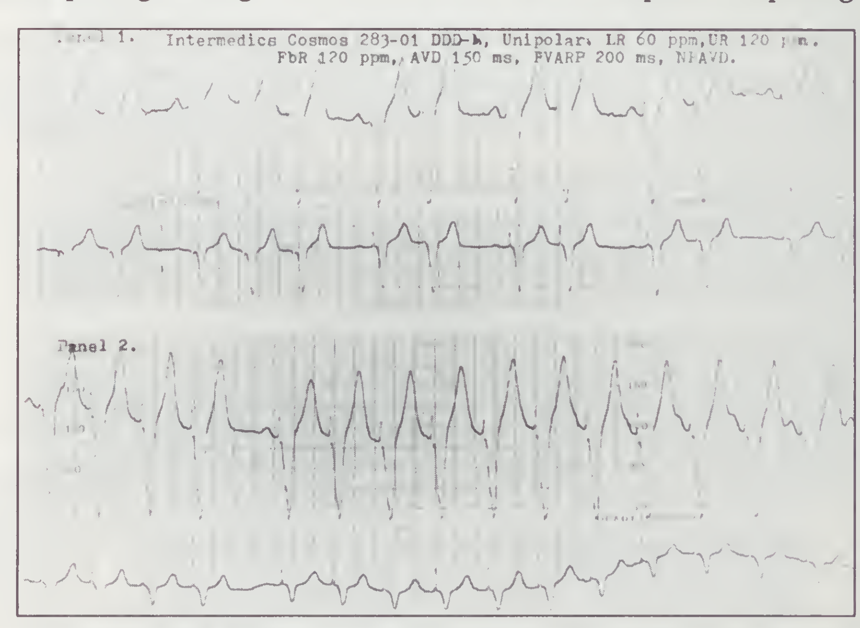


Fig. 6 Palpitations, dizziness. ST with Wenckebach UR response. Sinus P waves, prolongation of P-V interval, paced QRS complexes and pauses. Pause = 870 ms (PVARP + P-P interval + AVD). Tracking 1: 1.

in the VVT or DDT mode, or reversion to the VOO or DOO noise mode. Myopotential interference is usually brief and related to specific patient activity, usually in a unipolar unit.

Diagnosis: a) reproducible by isometric exercise: b) telemetry - Marker Channel, endocardial AEGM (marred by high f electrical artifact of variable amplitudes); c) programming to the AAT mode; d) may see myopotential artifact on a surface ECG lead.

D.Dx.: a) Af tracking which is also irregular; b) the sensing of false signals from a defective atrial lead; c) Fallback mode pacing which is slightly irregular; d) improved or abolished by decreasing the atrial sensitivity.

There is one case of a regular PT at the UR, one spike, provoked by myopotentials with a Medtronic 7000A, DDD-M pacemaker programmed as DVI. The AVI was short, the VAI normal and shorter than the URI. The UR mechanism was still fully functional although not normally visible in the DVI mode (4-6, 86, 87, 118, 145-156).

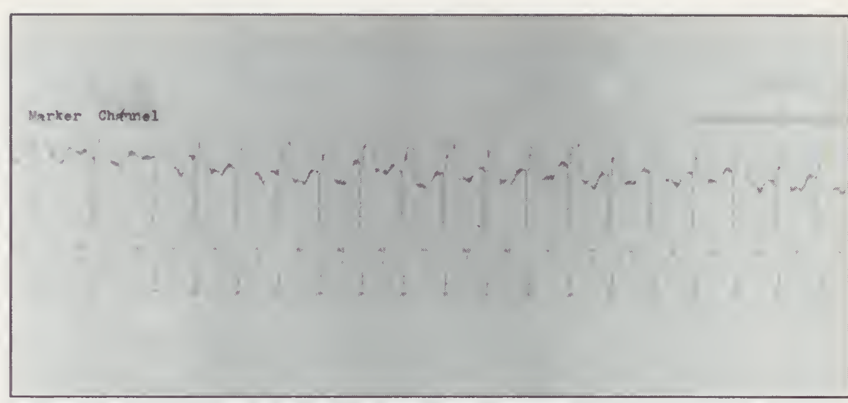


Fig. 7a

Oversensing myopotentials by the atrial lead results in "Oversensing Drive", or myopotential drive, with salvos or brief periods of ventricular pacing at or near the MTR.

c. Far-Field PMT (vide infra).

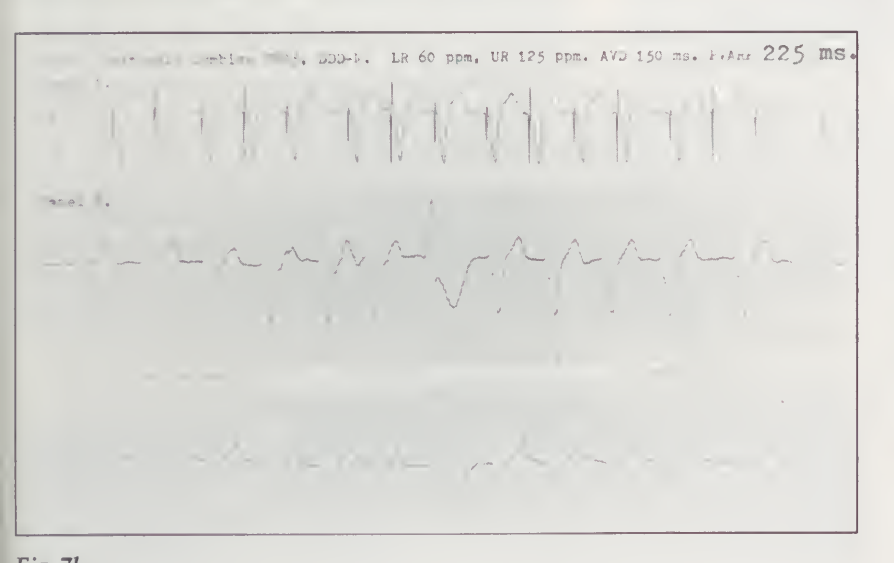


Fig. 7b

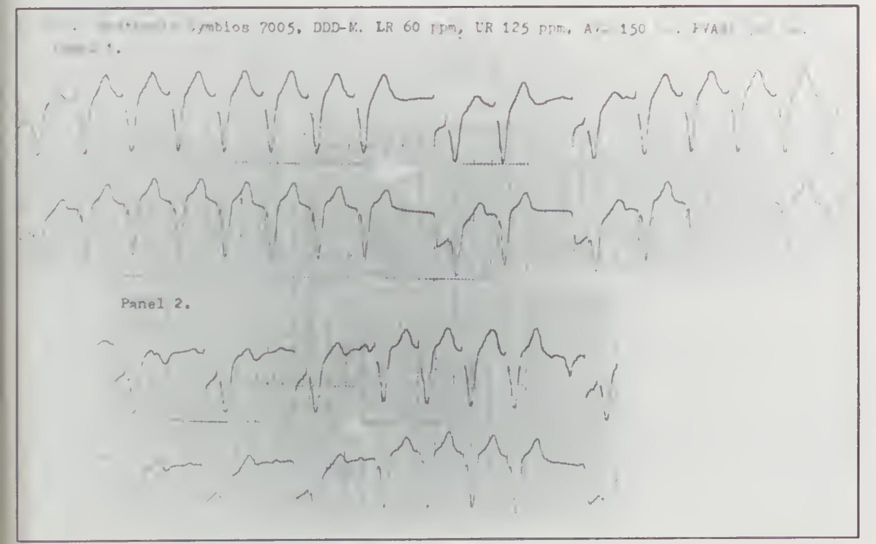


Fig. 7c

B. Exogenous Origin

Extra-Cardiac, **Environmental, EMI/ Noise Oversensing by the Atrial Amplifier. Electromagnetic Triggering.**

a. EMI Noise - induced Interference Mode asynchronous pacing operation, designed to prevent asystole in the presence of EMI. Reversion to Interference Mode pacing which is faster than the automatic interval. The atrial sensing channel perceives noises as an atrial signal, tracks it, and can induce ELT's and rapid irregular PMT's.

ECG: regular or irregular S-S intervals, but no definite P or P' waves; competitive pacing as S delivery on the T wave of an unsensed spontaneous beat; Vf induction by a unipolar VVI unit. One Spike.

b. Surgical **Electrocautery**, Bovie - Electrical and thermal burns from the high currents that are carried to the pacing electrode, which can cause VT, Vf and maybe Af.

c. Surgical electrical **Diathermy** - Vf.

d. TENS device.

e. External overdrive. CWS at a tachycardiac rate.

f. **Radiation** to one or both channels. AV sequential pacemaker Runaway.

g. Extracorporal Shock Wave **Lithotripsy** - occasionally can trigger ventricular outputs from electromechanical interference up to the URL. May cause ventricular tachyarrhytmias by inhibition of the ventricular channel or a bradycardia arrhythmia by burst pacing in the VVT mode by an asynchronous, competitive

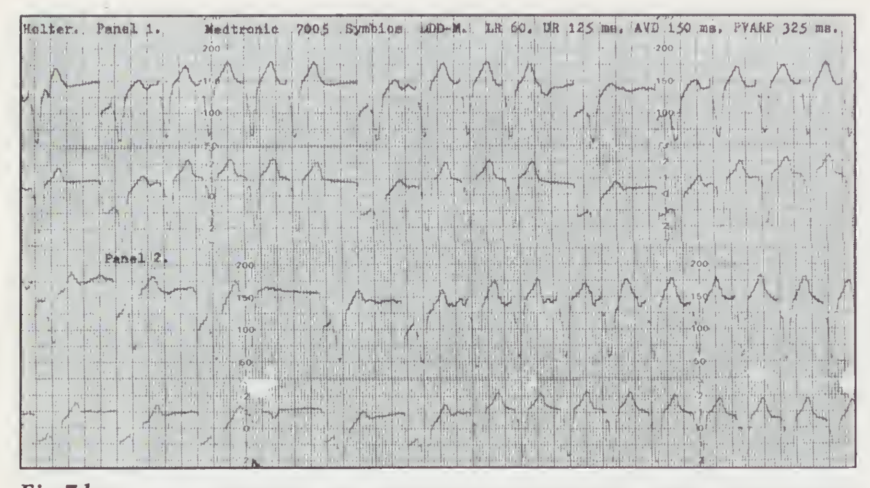


Fig. 7d

irregular VPT; moreover, atrial tracking of false signals can result in a PMT; may induce SVT's that trigger the ventricular output at rapid rates.

h. MRI - can trigger rapid vetricular responses and track dangerous atrial output rates up to 800 per minute, at the same rates as the RF modulation, in single or dual chamber units.

i. Triboelectric (static electricity) triggering of the V output.

j. **Defibrillation and Cardioversion** - can induce Vf via: damage to pacemaker circuitry, thermal and electrical burns at the electrode-myocardial interface; run-away; temporary pacer arrest and high thresholds (80,81,145-156).

k. A PMT and hypotension have been produced by intraoperative somatosensory evoked potential stimuli (a malfunctioning TECA 4). The tachycardia did not depend upon a reentry loop, but the atrial channel of the pacemaker sensed and tracked the SEP stimulus (156 a).

Particularly, unipolar pacemakers, which possess a large sensing antenna, are prone to endogenous or exogenous sources of interference, electric or magnetic energy - EMI.

40. **Far-Field PMT. Cross Ventricular Sensing Tachycardia. Atrial** Lead Over-Sensing of the Ventricular Stimulus **Afterpotential** or the Ventricular Event (the paced **QRS Depolarization**).

a. VDD and DDD. Atrial lead oversenses farfield phenomena, rather than rP' waves as in the usual Near-Field ELT. Without atrial participation. After the ARP is completed there is triggering of the ventricular output resulting in a sustained PMT. Also, a V stimulus delivered on the T of theVPB may induce a PMT. Favored by: a malpositioned atrial electrode near the ventricle, a unipolar pacing system, a short PVARP, a VRP > PVARP (the reverse should prevail), a short AVD, high atrial sensitivity and low ventricular sensitivity. Seen also with a single-pass lead. A Far-field PMT is unlikely if the PVARP is long. One Spike. ECG: One-spike V tachycardia, lacking a rP' wave; AV dissociation - P's at their own rate dissociated from the V paced beats; ventricular pacing in the absence of a preceding P or P' wave; groups and pauses; irregular or regular; the rate is between the LR and the UR or at the URL. Cycle length = sum of time between the V and the point of QRS complex sensing + the AVD. It may persist or be terminated by a VPB or magnet, etc. This Far-Field PMT may convert to the classical Near-Field rP' ELT. Dx.: Event Markers, AEGM - As coincides with the QRS beat; Holter; DDT mode; Esophageal ECG.

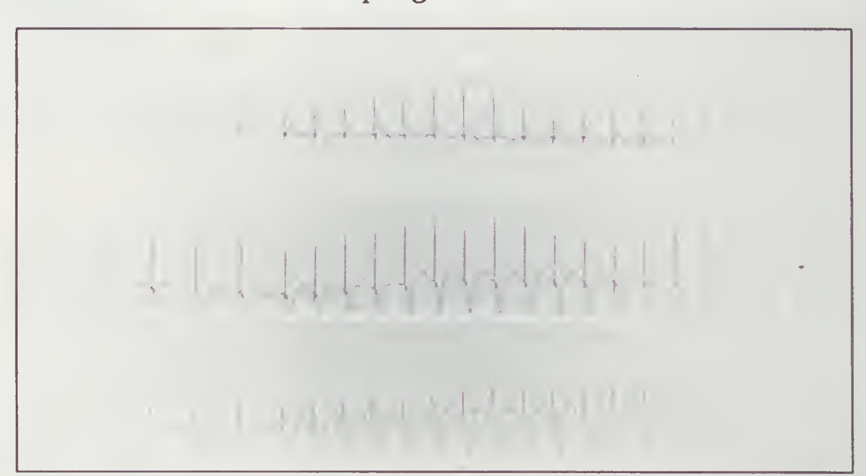


Fig. 7e

Fig. 7. Syncope. Complete AV block. Medtronic 7005 Symbios DDD-M. Failure of atrial capture and sensing. A. Marker channel. ELT. B. Panel 1. ELT at pUR of 125 ppm, initiated by APB's; Panel 2. Sinus rhythm,? P' before the VPB. C. Failure of atrial capture, sensing. ? PMT. D. ST tracking versus PMT, or both; PMT very likely. Failure capture. E. ELT, at the UR (125 ppm), due to atrial reciprocal beat.

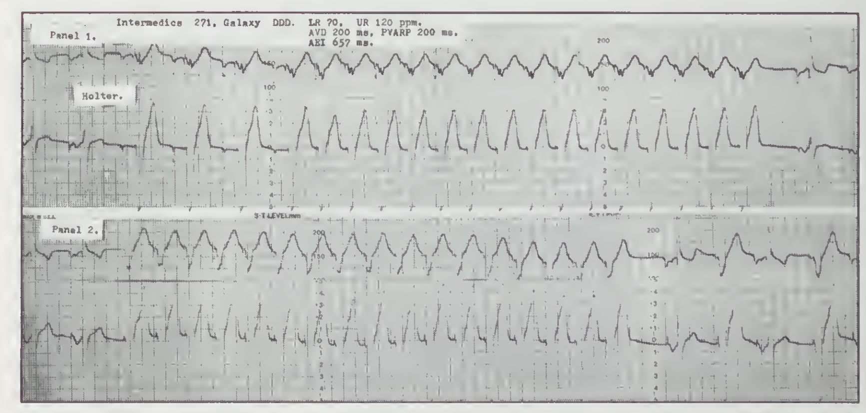


Fig. 8. SSS. Panel 1 - a 4 beat period of failure of atrial capture leads to ELT at UR. TTA activated with termination. Panel 2 - ELT, maybe due to APB with long P-V or spontaneously. TTA activated.

D. Dx.: a) ordinary PMT; b) an atrial triggered tachycardia; c) Wenckebach UR response, because of the groups and pauses (6, 13, 29, 116, 157-163). Figure 13. AVD excludes the usual ELT.

b. The Cordis Sequicor 233D, DDD pacemaker with a Block and Fallback UR features (but no Wenckebach) may cause a **Far-Field, R wave-Sensing Tachycardia**, interpreting the R as a P. This resulted in frequent reversion to UR Fallback behavior when the sensed AR exceeded the UR. This PMT resembled a CMT, but was irregular and AV dissociation was present (13).

c. Dodinot & Associates reported an **Endless Loop PMT** as a complication of single-chamber AAI pacing, called **Single Chamber Orthodromic Pacemaker Reentrant Tachycardia.** The far-field QRS was sensed in the atria; the pacemaker delivered an A stimulus synchronous with this sensing; it initiated AV conduction so that the resultant QRS fell beyond the ARP. Another A stimulus was then delivered capturing the atria; the process was perpetuated (163).

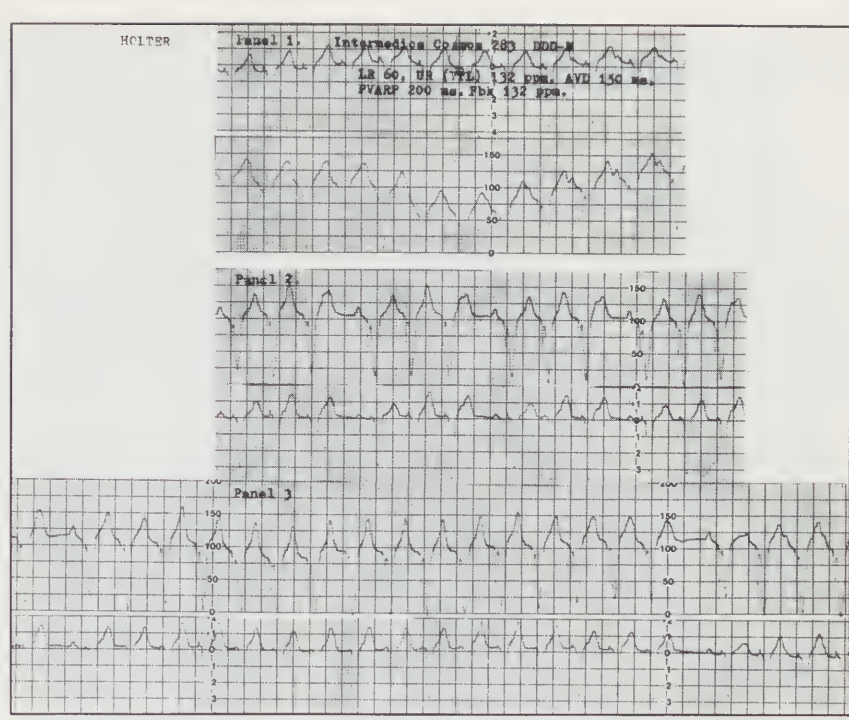


Fig. 9. Congenital complete AV block. Panel 1 - ST, ? exercising, being tracked 1:1. Panel 2 - ST with Wenckebach group beating and pauses. Panel 3 - ST at UR, 1:1 tracking, broken after 15 beats by the TTA, with a pause.

41. Crosstalk Tachycardia (CT).

Crosstalk means self-inhibition, the inappropriate detection of the atrial stimulus by the ventricular sensing amplifier. One or two Spikes.

a. With a Ventricular Triggering Period/Safety Pacing Period/Non-Physiological AVD. Its hallmarks are the abbreviation of the AVD with a 2-spike, A and V, PMT. It is favored by a high atrial output, a high ventricular sensitivity, a high LR, a short AVD, a short AEI, a short VBP, a unipolar lead and close proximity of the atrial and ventricular leads. It has been observed in DVI and DDD PG's with a Safety Period.

b. In a PG without a Safety Pacing Period. A one A-spike tachycardia without a V output (a native QRS or no QRS follows), or prolongation of the interval between the A stimulus and the suceeding conducted QRS complex. The rate of atrial pacing increases, because the sensed atrial stimulus by the ventricular channel initiates a new AEI; the interval between two consecutive A stimuli becomes the sum of: AEI + VBP, without a succeeding QRS complex. CT may result from an insulation break of the atrial lead and displacement of an endocardial / epicardial ventricular electrode closer to the atria (4, 6, 10, 17, 164).

c. A case of CT due to the ventricular amplifier sensing of the atrial A stimulus or polarization potential, rate 108 ppm, was reported by Den Dulk in a DDD unit, programmed as DVI. After removal of the magnet there was inhibition of the ventricular output which gave the paced atrial events a chance to be conducted to the ventricles via the normal conducting pathway with a long AVI; just before the resulting QRS a second A occurred, the AEI having been reset at the previous A output (by the

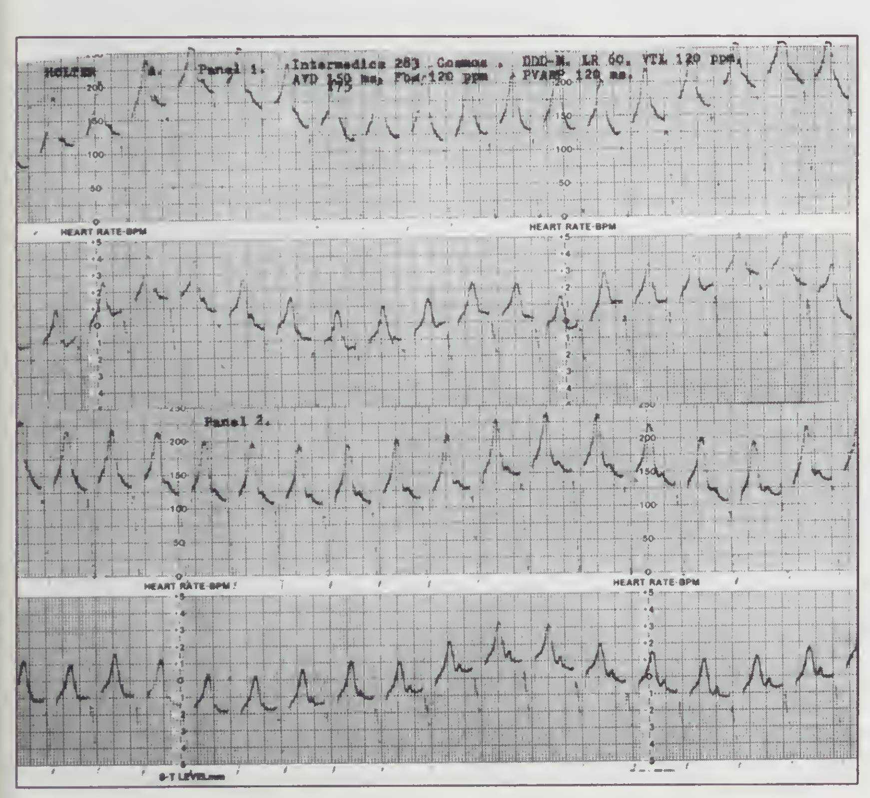


Fig. 10a

self-inhibition); the shortest R-R interval was slightly longer than the AEI (17).

42. **Orthodromic ELT.**

a. An unusual (the usual ELT is antidromic) mirror-image, orthodromic pacemaker CMT was provoked by a DDD PVB-SAS pacemaker, as antegrade AV conduction and retrograde electronic pacer conduction. The tachycardia was induced and sustained by VPB-synchronous atrial stimulation, a feature designed for the prevention of the usual CMT's. It was caused by intermittent atrial undersensing in the presence of a long AVI; following the atrial undersensing the pacemaker detected the conducted QRS complex as a VPB and delivered an atrial S 30 ms after detection of the "VPB". This atrial paced event was conducted to the ventricles with a long AVI; the QRS was again recognized as a VPB,inducing atrial stimulation. The synchronous atrial S was delivered at the end of a normal QRS complex. The tachycardia rate was 120-140 ppm (116-165) - an "Antegrade PMT". PVB - SAS response - Vitatron Quintech 931, Teletronics.

b. Den Dulk had already described in 1982 an orthodromic pacemaker tachycardia by a Medtronic dual demand DDD-DVI system; the AV node and the AV sequential PG provided the antegrade arm, an AP the retrograde arm (Case 2) (17).

c. Knorre et al reported a case of the unusual orthodromic CMT in a pacemaker with this optional mode of synchronous atrial stimulation following a VPB, sustained by retrograde electronic and antegrade natural AV conduction. The QRS complexes were identical to those of sinus rhythm; the A triggered by the QRS complex followed the start of each R wave by 45 ms (166).

43. **Ventricular Lead Undersensing Tachycardia.** One Spike.

QRS-S interval less than the URLI of the pacemaker- the paced ventricular rate is faster than the pUR; Spike to previous native QRS only. Regular. A rP' wave is sensed by the atria and triggers a V paced beat. Must exclude whether the preceding QRS complex occurred while the pacemaker was in its own VRP (137).

44. **Autonomous Pacemaker Tachycardia (APT).** Two Spikes.

A "third form of PMT". A 2-spike

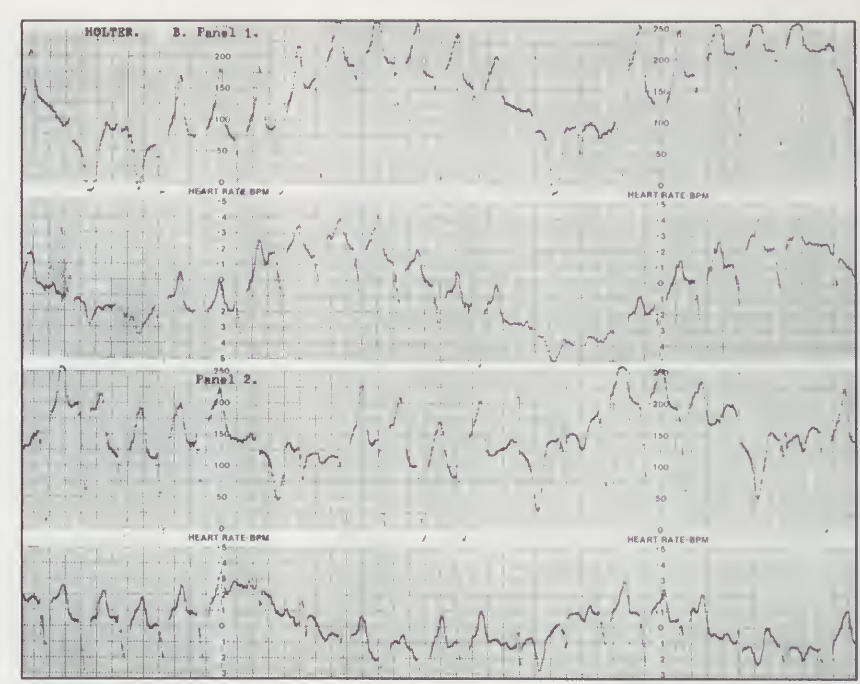


Fig. 10b

Fig. 10. Congenital complete AV block. A. Panel 1 - probably tracked ST. Panel 2 - tracked ST. B. Sinus, accelerated junctional beat with rP', and short periods of ELT (failure of atrial capture & ELT on other traces), or Pseudo-ELT.

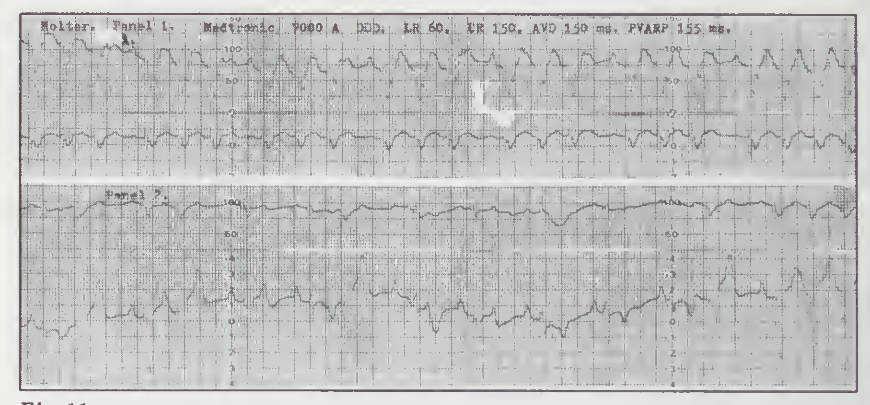


Fig. 11a

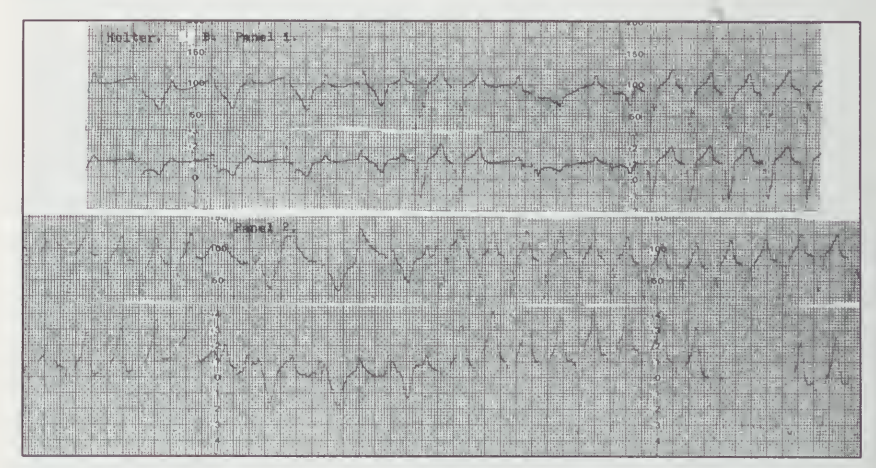


Fig. 11b

Fig. 11. Congenital complete AV block. A. Failure of atrial sensing and capture. Panel 1 - tracking of a fast ST with Wenckebach UR response. Panel 2 - intermittent tracking of ST at the UR. B. Intermittent failure of atrial sensing and tracking at the UR - SVT/ST - Pseudo-ELT.

tachycardia, as both A and V stimuli are present at an abbreviated interval, less than programmed. AEI < URLI/MTR. The tachycardia was at the MTR (100 ppm. in DDD and 150 ppm. in DVI). It ocurred in a certain model (Medtronic Versatrax 7000) and at certain pre-programmed parameters. It required sensed native events to be triggered but once initiated it was sustained autonomously within the PG.

Pathogenesis: a function of the design, an eccentricity, of the PG; failure of the native R wave to cancel the command for release of a V stimulus; the switch circuit opening and closing, normal sensing of cardiac activity, P and QRS, during an interval of the pacer timing cycle in which the PG circuit latches electronically into that tachycardia mode; certain noncompatible programming, and myopotential sensing.

Prevention: by a change in the design, as the new programmer will not program the parameters that caused it (4, 6, 7, 18, 167, 168). Versatrax series.

45. **Pacemaker Tachycardias secondary to the Tracking/Sensing of Spontaneous, Intrinsic Tachycardias.**

a. ST, AT, Af, AF - normal tracking by an atrial sensing pacer. Af tracking can result in regular or irregular atrial and ventricular pacing, intermittent lack of atrial f wave sensing (usually no f sensing with reversion to the LR DVI or VVI mode); periods of rapid, irregular ventricular pacing or pacing stimuli which do not capture due to the ventricular MRP, of variable morphology - a chaotic pattern; there are no P waves; no A spikes are seen except occasionally at the end of an AEI if the f waves go unsensed; all ventricular complexes are preceded by a V stimulus; the rate may be near or at the MTR. AF tracking can lead to a rapid, more regular, sustained tachycardia at the UR; there may be a 2:1 block response; the cycle length gradually prolongs after magnet application, and the rate gradually returns to the MTR after magnet removal. A VAT pacer could track F waves, but it competed with normally conducted complexes due to the lack of a ventricular sensing circuit. One Spike, usually.

Diagnosis: Magnet or programmer application, to disable sensing or to inhibit the pacemaker temporarily: the tachycardia stops with a slower rate when irregular f waves or regular F waves can be visualized; no atrial pacing; ventricular pacing

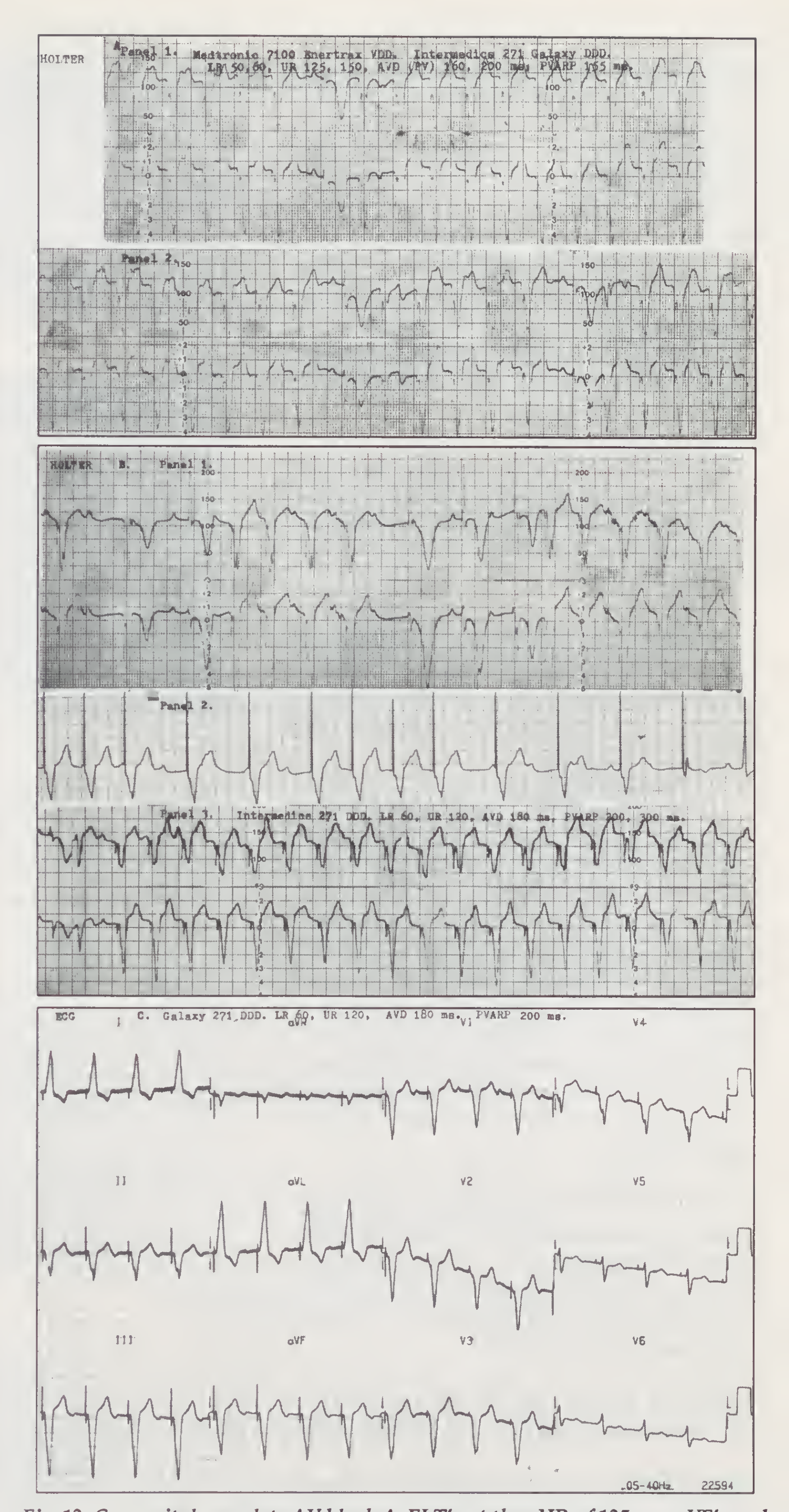


Fig. 12. Congenital complete AV block A. ELT's at the pUR of 125 ppm. VE's and native beats with rP' with ventricular fusion may have induced the ELT's. B. Panel 1 - VDD. LR 60 ppm, UR 150 ppm. Failure of atrial sensing, late sensing. Intrinsic accelerated junctional beats/ rhythm, with tracking of sinus P waves. Panel 2 - Intermittent failure of atrial tracking. The 5th beat from the end may be a VE with rP'. Panel 3 - DDD. Probably ST that converted to PMT. A Far-Field PT seems less likely. C. A slow, atypical ELT, BELT, rate 97 ppm. There was no native tachycardia when the pacemaker was turned-off (and the patient's symptoms disappeared when the pacemaker was re-programmed to the VVI mode).

waves or regular F waves can be visualized; no atrial pacing; ventricular pacing at the LR. On programming to the VVI mode atrial activity can be visualized. Atrial telemetry - Timing markers, AEGM.

D.Dx.: Of rapid, irregular or regular PMT's:

a. Tracking of native Af or AF, AT's.

b. myopotential oversensing by the atrial preamplifier.

c. atrial sensing of false signals from a defective atrial lead. (6, 13, 14, 89, 112, 116, 141, 142, 169-171).

b. Triggered Pacing.

VVT pacing with a Wide QRS Complex Tachycardia. The S spike presents within the sensed wide QRS complex, rather than at the onset of the QRS complex. DDT. AAT. One Spike.

46. **DDI mode pacing can cause an Endless Loop Arrhythmia without tachycardia (the rate is at the LRL).** The rate is slow because the UR and LR intervals are identical (116,172).

47. **Recently, PMT was reported in patients with a single lead VDD pacing system, not related to retrogradely conducted P waves.** One Spike. This could be traced to the abnormal sensing of the terminal forces of ventricular activation and/or of the T wave; also, the possibility of interference between the ventricular and atrial electrodes (crosstalk) was considered. The reduction of atrial channel sensitivity and the best bandpass filter were effective in prevention, while lengthening the TARP was not (173).

48. **A CPI DDD pacemaker with rate-smoothing may show an increase in atrial pacing beyond the pUR.** An URI violation can occur in a DDD pacer with A-A timing if maintenance of the LRI takes hierarchical precedence over the URI.

49. **ELT's could result in secondary ischemic tachycardias.**

Resumen: **Este trabajo discute y repasa los muchos tipos de tachycardias asociadas a marcapasos cardíacos a las cuales el médico contemporáneo podría enfrentarse. Debido a que un diagnóstico certero es la llave para un manejo apropiado, énfasis va a ser puesto en el diagnóstico diferencial de estas complejas tachy-**

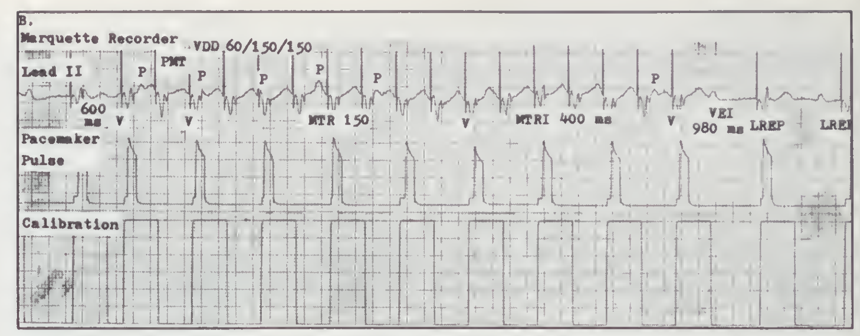


Fig. 13a

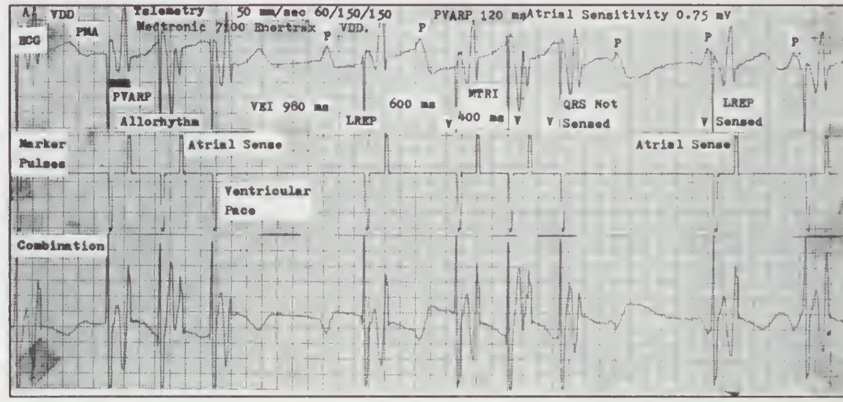


Fig. 13b

Fig. 13. Congenital complete AV block (same case as No. 10). Epicardial. A. AVD (PV) 150 ms. Far-Field Ventricular Sensing (Cross-Ventricular Sensing) by the atrial lead. PMT at the UR. The P's and V's were dissociated. Allorhythms of paced ventricular beats. A_S and V_P marker pulses. B. Same. The A_S (atrial sense) marker pulse denotes the atrial oversensing of the ventricular V stimulus and/or the ventricular QRS beat. (From: PACE 9: 710, 1986, with permission. Ref. 158).

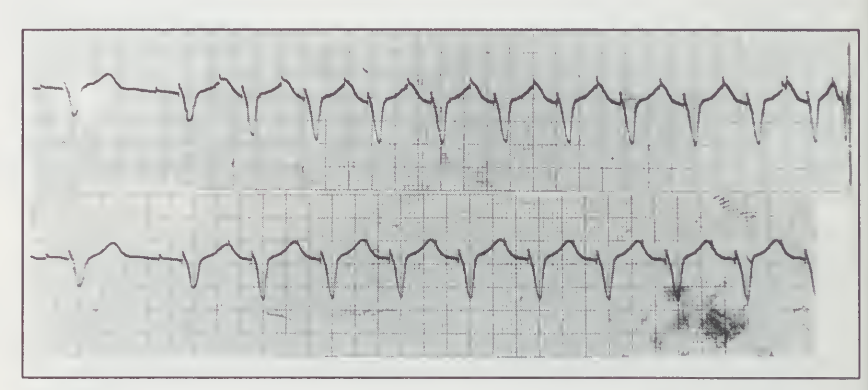


Fig. 14a

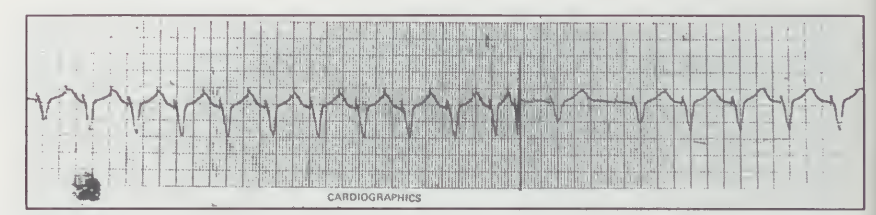


Fig. 14b

Fig. 14. Data unknown. Cosmos II. Early post-implant period. Two Spikes. LR 60 ppm, AVD 200 ms, AEI 800 ms. There may be failure of atrial capture. A. AV sequential pacing at 110 ppm in the upper trace and 100 ppm in the lower. B. The rate is 110 ppm on the left and 100 ppm on the right. Repetitive Non-reentrant Ventriculoatrial Synchrony/AVDA is suggested.

arrhythmias. Un acercamiento y punto de partida didáctico es asumido en un esfuerzo para organizar y simplificar en la medida posible esta parte del vasto y complejo campo de la medicina.

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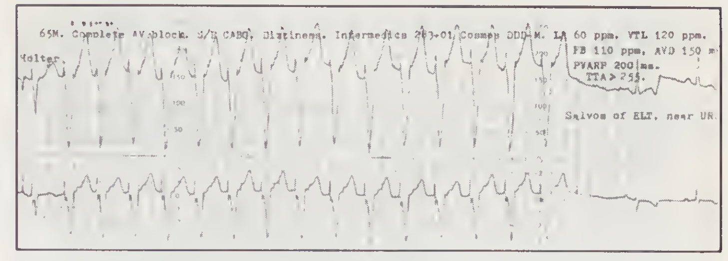


Fig. 15. Questionable intermittent failure of atrial capture. Salvos of ELT near the pUR, perhaps initiated by an APB or an atrial reciprocal beat. Cosmos synchronous Fallback UR response from 120 ppm to 110 ppm and activation of the TTA. The PVARP was lengthened to 245 ms and the patient has been asymptomatic.

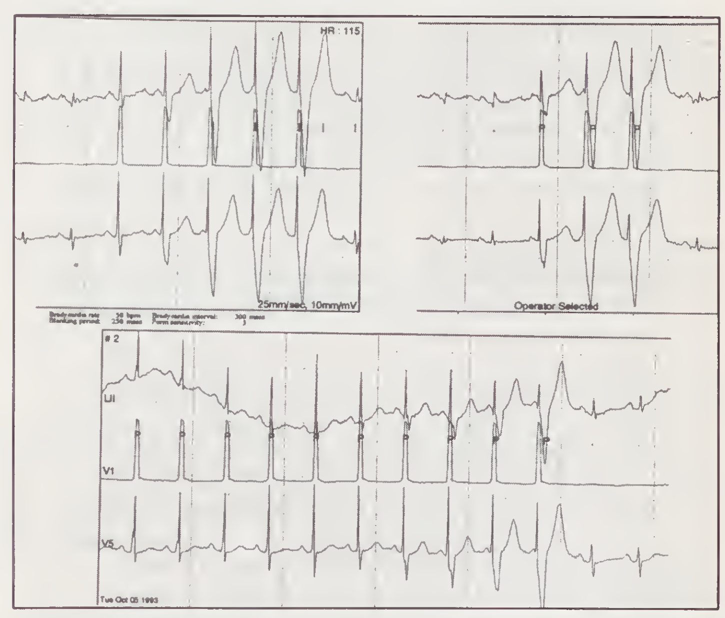


Fig. 16. SSS, MI 1986. Medtronic 7000A Versatrax DDD. Chest pain, dizziness, palpitations. LR 60 ppm, UR 125 ppm, AVD 225 ms, PVARP 155 ms, VRP 235 ms, VBP 12 ms, Bigeminy Protection. AEI 1775 ms. P wave - V stimulus dissociation. Brief runs of PMT, perhaps caused by Atrial Lead Amplifier Oversensing - Far-Field oversensing of Myopotentials.

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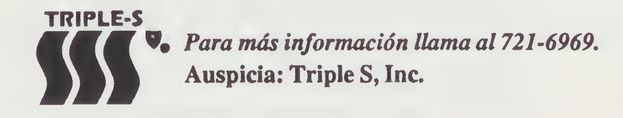
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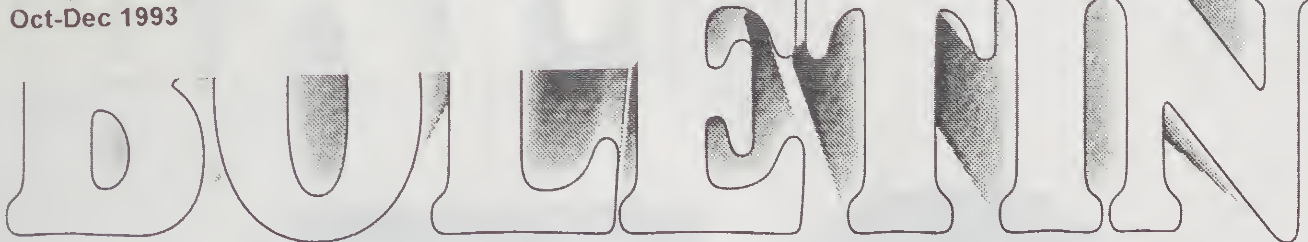
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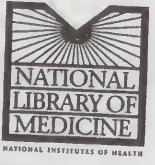


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Contenido


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1902



¿Estamos realmente preparados...?

Por Miguel Colón Morales, M.D.

El jueves 4 de noviembre de 1993 a las 10: 07 P. M. se sintió en todo Puerto Rico un temblor de tierra de suficiente intensidad y duración (5 unidades de Richter) como para asustar a muchos ciudadanos que tuvimos la mala experiencia de sentirlo .

Me vino a la memoria otro episodio similar que experimenté hace ya muchos años durante mi servicio militar mientras estaba estacionado en Tokio, Japón. En aquella ocasión pude ver las paredes de la barraca donde me encontraba moviéndose de un lado para el otro como si fueran a caerse. Aquel temblor de tierra fue mucho más prolongado y creí se acababa el mundo. ¡Tremendo susto que jamás olvidaré!

A final de la década del 50 existía el temor de un ataque nuclear por parte de la Unión Soviética a las ciudades grandes e importantes de los Estados Unidos. Se construyeron refugios subterráneos para la supuesta protección de los ciudadanos en tal eventualidad. Me encontraba en ese entonces en la ciudad de Nueva York recibiendo entrenamiento como anestesiólogo. Una parte del entrenamiento era aprender a cómo poder ofrecer mis servicios como especialista en situaciones de desastre total donde no dispondríamos del equipo y drogas convencionales, muy efectivas y sofisticadas, pero que difícilmente estarían disponibles bajo esas condiciones de desastre sin electricidad, agua, tanques de oxígeno y gases anestésicos, etc., para atender un número exagerado de heridos y enfermos.

En un seminario que tuve la oportunidad de asistir sobre Medicina de Desastre hace algunos años, se presentaron descripciones por médicos que se habían visto en la necesidad de participar en el cuidado de pacientes víctimas de desastres naturales tales como terremotos, huracanes severos, maremotos, bombardeos intensos (Londres, Nagasaki, Hiroshima) donde todas las utilidades a las cuales estamos acostumbrados habían sido destruidas o no estaban accesibles y las líneas de suplido de materiales y drogas no existían como resultado del caos.

Era verdaderamente deprimente y espantoso las descripciones que los deponentes hacían y el sufrimiento humano que resultó de estas situaciones de desastre inesperado para las cuales el personal médico ni la comunidad en general estaba preparada.

Debido a la localización de nuestra pequeña isla y su naturaleza geológica considero debe existir alguna planificación más realista que la existente en la Defensa Civil en el presente. Aunque sea una preparación psicológica, que nos permita controlar el pánico y funcionar dentro de las circunstancias especiales de todo desastre, en forma efectiva.

En este momento de meditación luego del reciente temblor de tierra experimentado, es mi propósito hacer un llamado a la clase médica y otros profesiones aliadas a la salud, a los hospitales, al Departamento de Salud, para que todos hagamos un esfuerzo por estar mejor preparados para poder ejercer nuestras funciones en forma verdaderamente efectiva para conservar la salud y la vida en una situación de emergencia nacional que pueda resultar de un desastre natural de gran magnitud como son los terremotos, huracanes, explosiones y otras causas similares. Como los buenos niños escuchas, los médicos y los profesionales de la salud debemos estar preparados psicológicamente y organizacionalmente para esa eventualidad.

Los planes de desastre de nuestros Hospitales deben ser revisados y actualizados para estar preparados para lo peor de estas situaciones que van mucho más allá que un simple apagón de la luz y/o la ausencia de la electricidad y el suplido de agua por un tiempo corto. Así también debemos asegurarnos estará disponible un suplido de medicamentos básicos y esenciales para nuestros enfermos y heridos como consecuencia del desastre que sea.

Volvemos a la pregunta inicial que quisiera cada uno de los lectores se conteste a si mismo: ¿ESTAMOS REALMENTE PREPARADOS...?

Director Departamento de Anestesiología
Hospital del Maestro, Hato Rey, P.R.

Articulos Originales:

Brain Abscess Due to Pseudallescheria boydii in an HIV Patient

—Rafael Altieri, MD
Melba Colón, MD
Carlos H. Ramírez-Ronda, MD, FACP

Summary: This report describes a 45 year old man with history of insulin dependent diabetes mellitus and intravenous drug abuse (IVDA) who was found living in a ditch of stagnant water and developed a brain abscess by from which *Pseudallescheria boydii was* recovered. This was the first manifestation of an opportunistic infection. He was treated with intravenous amphotericin B and surgical drainage of the cerebral abscess, in spite of therapy the patient died. This case should alert us to consider this organism in the diagnosis of CNS infection in the HIV infected patient specially when there is epidemiological evidence to suggest exposure to this microorganism.

Introduction

Pseudallescheria boydii is a true fungus previously known as **Petrielluium boydii** or **Allescheria boydii.** Is ubiquitous in soil and commonly found in polluted streams and costal waters." The most common infection occurring with **P. boydii** is the mycetoma, ordinarily in farmers in tropical and subtropical climates.[2] Infection other than mycetoma is seen primarily in the immunocompromised, although some cases have been seen in otherwise healthy people. Other organ involvement has been described with involvement of the lungs, causing necrotizing lung infection or other infectious processes at different sites like otomycosis, keratitis, prostatitis, osteomyelitis, sinusitis, endocarditis and thyroid abscesses. [7,8,14,15].

Central nervous system involvement with this fungus is a very rare event and seen in patients with other predisposing causes that can include immunosuppression and near drowning.[3] In our literature search this infection has not been reported in HIV infected patients. The report describes a case of a patient infected with HIV that developed a brain abscess due to **P. boydii** as his initial manifestation of AIDS.

Case Report

The case is of a 45 year old man with history of insulin dependent diabetes mellitus (IDDM) and intravenous drug abuse (IVDA) that was brought to the state psychiatric hospital on September 29, 1990 after being found Iying in a ditch of stagnant water near a crematorium. The patient after several days began to experience aggressive behavior He was transferred the same day to the Puerto Rico Medical Center Emergency Room for further evaluation. He was found unresponsive having positive meningeal signs and left sided hemiparesis. Physical examination at the ER did not reveal any sign of trauma. His vital signs were as follows: Blood pressure 150/96, pulse 90 per minute and regular, a respiratory rate of 34 and a temperature of 37.5 C.

An initial head CT Scan was reported as having a right frontal abscess with evidence of shifting of midline structures. The initial laboratory studies reveals: a hemoglobin of 15.5 grams, hematocrit of 45.4%, a WBC count of 13,000 with left shift and a platelet count of 294,000. Serum electrolytes, glucose and renal function tests were within normal limits. The Chest X-Ray was normal. After admission to neurosurgery the patient was taken to surgery for drainage of the cerebral abscess. After blood cultures were taken the patient was started on nafcillin, clindamycin and chloramphenicol.

After surgery he remained afebrile and without improvement of the neurologic status. On October 4, 1990, or 5 days after surgery the patient developed fever, uncontrolled blood pressure and respiratorv distress requiring intubation and mechanical ventilation. Results of the initial blood cultures demonstrated no growth and a preliminary report of the brain abscess culture was reported positive for fungi. Serologic studies confirmed the diagnosis of HIV infection. The patient was started empirically on amphotericin B therapy. There was little improvement and the patient eventually developed a left lower lobe nosocomial pneumonia. Cultures were taken and based on the results of a sputum gram stain

Infectious Diseases Program University of Puerto Rico
School of Medicine San Juan VA Medical Center, One Veterans Plaza San Juan, Puerto Rico 00927-5800

the patient was started on October 8, on ceftazidime plus amikacin. The other antibiotics were discontinued.

In spite the new antibiotherapy the patient clinical status deteriorated. On October 10, 1990 the sputum culture grew **Klebsiella pneumoniae, Enterobacter cloacae, Pseudomonas aeruginosa and Ancinetobacter anitratus** all susceptible to the antibiotic regime the patient was receiving.

Three days later the patient developed multiple organ failure, he was started on aggressive supportive therapy, but in spite of all efforts, 24 hours later the patient die. Necropsy was not done. On October 23, one week after death; the microbiology laboratory reported identification of the fungus as **Pseudallescheria boydii.**

Discussion

Fungal infections causing an intracerebral mass lesion or other central nervous system pathology are frequently seen, specially in patients who are receiving immunosuppressive or cytotoxic therapy or suffers of chronic illness. The frequency of fungal CNS infections and the variety of pathogens is smaller for patients with HIV disease and AIDS.

The initial exposure to fungal pathogens is common, since many of these agents are ubiquitous in nature and distributed worldwide. The infection remains quiescent only to express itself when the cellular immune disfunction caused by HIV virus is manifested. The breakdown of cellular immune system is not the only factor necessary on a latest infection to manifest as an active disease. A significant disparity is been reported in the frequency of cases between Cryptococcus and Aspergillus sp in HIV patient. Also the geographical distribution plays a role in the relative frequency of infection as seen with **Histoplasma capsulatum.**

Crytococosis is the most frequent life threatening fungal infection, accounts for approximately 5-8% of all opportunistic infections in patients with AIDS. Most infections presents with symptoms of meningitis and occasional focal neurologic deficit as a manifestation of a crytococoma.

Other less common fungal pathogen include **C. albicans** which in spite of causing the commonest fungal infection in patients with AIDS, that is, oral candidiasis only 9 cases of cerebral involvement have been reported. [4,12] This comes as a surprise due to the fact that oral trush is frequent in these patients.[4]

CNS infection with **Aspergillus fumigatus** is uncommon even in immuno compromised patients. Four cases of AIDS related meningitis, encephalitis or abscess by aspergillus have been reported.[4]

Another pathogen is **Histoplasma capsulatum** disseminated histoplasmosis in a very unusual presentation can manifest as a brain abscess.[13]

Cerebral abscesses due to **P. boydii** are uncommon. Most cases occur in patients who have had a history of trauma, in patients who have underlying disorders for which therapy with steroids, chemotherapy or radiotherapy is required, with the resultant immunocompromise.[5] P. boydii is a soil saprophyte which can be found in large numbers in decomposing vegetation and fertilized soil. The usual portal of entry is the respiratory tract and or a break in the skin. In the present report while we do not have a definitive exposure, he was found in an ditch near a crematorium and this might have been the probable source of exposure and entry.

In this report we describe a diabetic patient with HIV infection found Iying on a ditch of stagnant water and most likely covered with contaminated soil containing **P. boydii** and presented a brain abscess positive for **P. boydii.** In this particular case the portal of entry is not evident there is no evidence of aspiration pneumonia or abrasion to consider these alternative as foci of subsequent hematogenous dissemination to the brain. Sputum culture also failed to reveal this organism.

We want to clarify that the presentation in an immunocompromised patient with a CNS space occupying lesion usually points toward other diagnosis like CNS toxoplasmosis, CNS Iymphoma and if brain abscess is likely Nocardia, other bacteria and among the fungi Aspergillus and Candida. The unusual and uncommon microorganism recovered in this case, makes us bring the fact that even the rarest of pathogens can cause disease in these patients. The epidemiologic background should sensitize us to consider this rare microorganism in immunocompromised people exposed to decaying vegetation or stagment water and soil. Also disturbing, is the fact that of the disease progressed rapidly in this patient and did not have the insidious onset and slow progression seen in other immunocompromised patients.[10,1] The reason for this migh be his HIV disease plus diabetes mellitus.

As in several other reports of CNS infection due to **P. boydii** our patient died.[3,10] This probably can indicate the resistance of this fungus to currently available antifungal agents as previously described.[5,6] Multiple authors agree that miconazole is the drug of choice to treat **P. boydii.** Nevertheless the data has been previously gathered from soft tissue and joint infections with poor results in cases of disseminated and or CNS infections. In the patient with a brain abscess caused by **P. boydii**, successful outcome is probably more related to surgical drainage than chemotherapy, and maybe related to the blood brain barrier marginal penetration of miconazole, [7,8,9] although there have been reports of effective penetration.[10,11] Appropriate treatment is most likely a combination of surgery and chemotherapy and localized lesions are usually resected.

P. boydii in an HIV infected patients adds to the innumerable opportunistic infections in these

patients and challenges once more, us the physicians that threat the HIV infected person.

Resumen: **Este informe describe a un paciente de 45 años con historial de diabetes mellitus y abuso de drogas endovenosas que fue encontrado tirado en una alcantarilla de agua estancada. El paciente desarrolló un abceso cerebral por Pseudoallercheria boydii como manifestación inicial de su enfermedad por VIH. Fue tratado con amphotericina B endovenosa y drenaje quirúrgico del abceso. A pesar del tratamiento el paciente falleció.**

Este caso debe alterarnos para que consideremos a este microorganismo en el diagnóstico diferencial de infección del sistema nervioso central en pacientes infectados con el HIV especialmente cuando hay evidencia epidemiológica que sugiere exposición de éste.

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Reflexiones sobre Severo Ochoa*

C. R. Font, M.D.**

"Tiene la difícil sencillez de los hombres brillantes... Es un investigador. Un simple, puro, nada más y nada menos, conocedor, creador, en parte estudioso, descubridor de aquello que nos levanta y nos descubra..."

-Tico Medina, Con el Profesor Severo Ochoa,
Un Domingo en Nueva York, *ABC*, 27 sept. 1972.

Resumen de la vida de Severo Ochoa, (De ref.22).

Fecha de nacimiento, Luarca, Asturias, 24 sept. 1905.
Fallecimiento, Madrid, lro. Nov. 1993, (88 años).
Estudios: Málaga, 1921, Bachiller Superior, Univ. de Madrid, 1929, M.D., (honores).

1931 - 35: Profesor de Medicina Experimental, Conferenciante en Fisiología & Bioquímica, Facultad de Medicina, Madrid.
1935 - 36: Director, División de Fisiología, Instituto de Investigaciones Médicas, (Prof. Jiménez Díaz).
1936 - 37: Investigador Invitado, Prof. Asistente, Keiser Wilhelm, Institute Medical Research, Berlín.
1937: Lankaster investigator, Marine Biology Lab, Plymouth, U.K.
1938 - 40: Ayudante de Bioquímica, Nuffield, Oxford.
1941 - 42: Instructor de Farmacología e Investigador Asociado, Facultad de Medicina, Washington University, St. Louis, (Dr. Cori).
1942 - 45: Investigador Asociado, Facultad de Medicina, Universidad de Nueva York, (NYU).
1945 - 46: Profesor Asistente de Bioquímica, NYU.
1946 - 54: Profesor de Farmacología & Jefe del Departamento, NYU.
1954 - 74: Profesor de Bioquímica y Jefe del Departamento, NYU.
1974 - 85: Miembro Distinguido, Roche Institute of Molecular Biology.
1985 - 91: Catedrático de Biología, Universidad Autónoma de Madrid.

Intereses: La bioquímica muscular y de fermentaciones; enzimas de la respiración celular; mecanismos enzimáticos; asimilación del CO2; ciclos de los ácidos grasos y del ácido cítrico; síntesis de proteínas y de los ácidos nucleicos; código genético y expresión del mensaje genético.



Fig. 1. Dr. Severo Ochoa, en 1959.
(Cortesía de la Universidad de Nueva York, NYU).

Contribuciones de Severo Ochoa a la Bioquímica. (Ref.23).

1. Estudios sobre carboxilación y decarboxilación.
2. Descubrimiento de la enzima málica.
3. Estudio de los mecanismos enzimáticos del ácido cítrico.
4. Descubrimiento de la enzima condensante.
5. Síntesis enzimática de poliribonucleótidos.
6. Descubrimiento de la fosforilasis polinucleótida.

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*Contribución No. 2, Laboratorio de Neurobiología.

**Catedrático de Biología, Director Laboratorio de Neurobiología, Dept. Natural Sciences, Room 307, Mercy College, 555 Broadway, Dobbs Ferry, New York, 10522.

Aspectos Humanos:

Siempre que voy por el Viejo San Juan, me doy una vuelta por el edificio Ochoa. Con su vocación por la música, me lo imagino cantando en un dúo con el mar. La biografía sobre Severo Ochoa destaca que se quedó huérfano hacia los 7 años. Su padre tenía negocios en Puerto Rico, al igual que sus tíos, (15). El edificio Ochoa en el Viejo San Juan es testigo de ese esfuerzo. También era familia de Fernández Juncos.

Creció protegido por su familia. Le gustaban los viajes, la arqueología, la fotografía, la música y claro, la ciencia, (la biología en su más amplio sentido). Le interesaron los automóviles en su Asturias natal, (Luarca). Escoge la medicina, -sin interesarle jamás el ejercicio de la profesión- ya que le acercaba mejor a sus propósitos: el estudio de la biología experimental. Su maestro en Madrid fue el Dr. Juan Negrín.

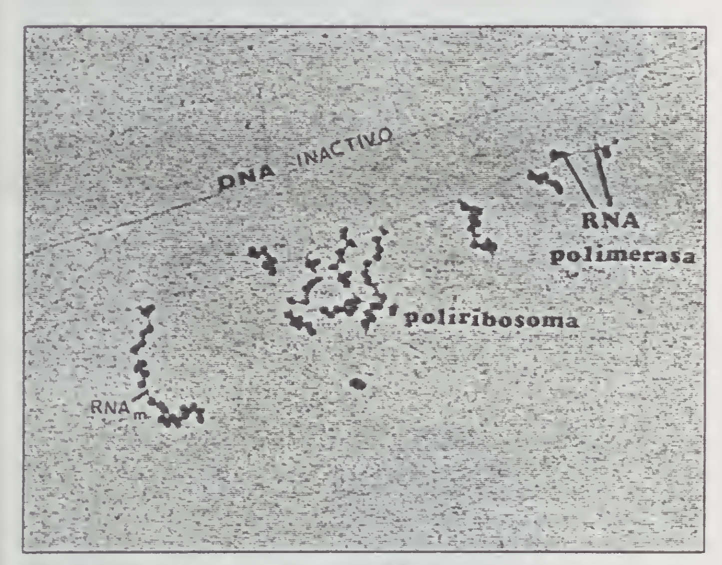


Fig. 2. Síntesis de proteínas, 158,000 X.
(Cortesía del Dr. O.L. Miller Jr., Virginia).

Negrín era canario. Su acento isleño, le recordaría los acentos que de alguna manera le llevaron sus familiares de Puerto Rico, aunque sea por referencias: el seseo y el silbar de palabras. Igual en Canarias que en Puerto Rico, no existen diferencias de pronunciación de clase alguna, ni diferencias en los usos del castellano. Dos gotas de agua en islas unidas por el Atlántico. Juan Negrín tenía un padre que se dedicaba al negocio de la exportación de plátanos o bananos, (lo que en Puerto Rico se denomina guineo). Negrín se formó en el ambiente liberal alemán de los años 1910-20. Se había formado en química primero y en medicina más tarde en Leipzig. Esa influencia le lleva a aprender alemán e inglés. Se forma en Alemania con Meyerhoff y con otros grandes maestros.

La Guerra Civil lo separa de España y se va a Inglaterra, Francia, Alemania y finalmente se queda en los EE.UU., (St. Louis, New York). La mujer de Severo Ochoa, Carmen Cobián, representa uno de los secretos de su triunfo. No habría un Severo Ochoa sin



Fig.3. Dr. Arthur Kornberg, primer alumno graduado del Dr. Severo Ochoa. Sintetizó DNA en un tubo de ensayo, siguiendo la técnica aprendida de Ochoa.
(Cortesía del Dr. A. Kornberg, Stanford).

el estímulo y la sabiduría de Carmen Cobián: su cuidadora oficial, su ángel de la guarda, su inspiración y su paño de lágrimas. Carmen Cobián mantenía lazos familiares en Puerto Rico. De hecho, fue a través de los padres de los dos, que la pareja se conoce. En 1936, mientras Severo Ochoa es rechazado por Negrín en las oposiciones a una cátedra de fisio-



Fig. 4. Fago T4. Este fago contiene DNA. El virus del mosaico del tabaco contiene RNA. Los virus con RNA pueden considerarse moléculas mensajeras. El empleo de fagos es muy útil para estudios de la síntesis de los ácidos nucleicos.
(Cortesía del Dr. Finch, MRC, Cambridge, U.K.)

logía para Santiago, (se la darían al Dr. Folch), Carmen Cobián viaja a Puerto Rico. Negrín nunca le perdonó a Ochoa que mantuviera buena amistad con Jiménez Díaz. El viaje de Carmen Cobián tenía relación con un dinero de la venta de unas propiedades familiares. Carmen Cobián mantendrá hasta el final su agradecimiento hacia los puertorriqueños: trabajará de manera voluntaria como traductora de inglés-español, en hospitales de Nueva York para aquellos enfermos boricuas que desconocían el inglés.

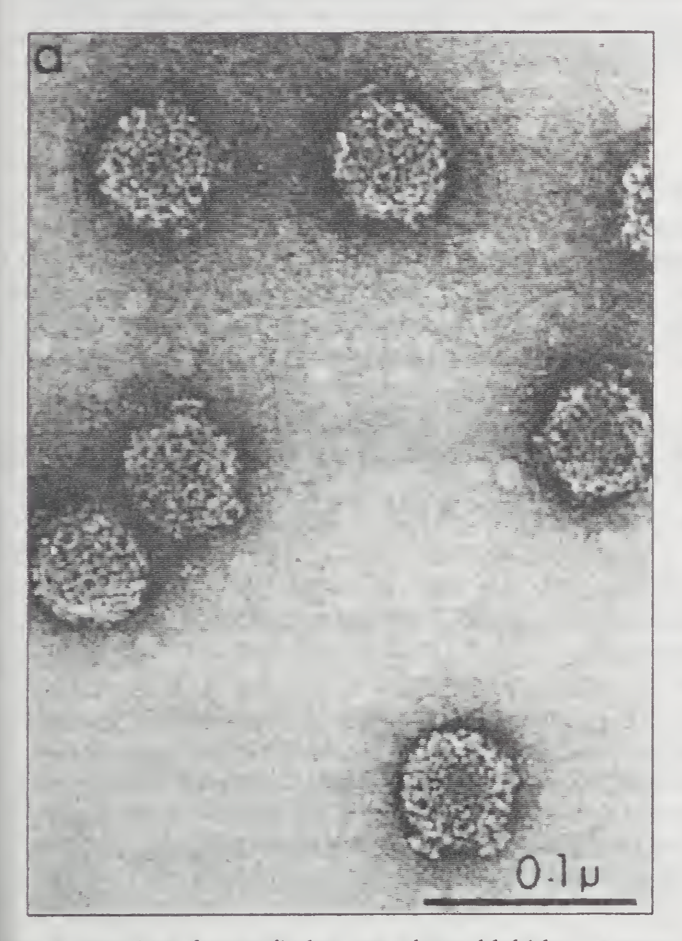


Fig. 5. Reovirus fotografiados con glutaraldehido y acetato, (2%). Aumento de 225,000 X. Los reovirus son virus tipo RNA, (respiratory enteric orphan virus, reovirus). Infectan el tubo digestivo y las vías respiratorias sin causar enfermedad normalmente. Se aprecia una cápside o cápsula de 92 capsómeros. El virión, (centro), contiene RNA de doble cadena. Resiste los disolventes de los lípidos. Hay tres tipos inmunológicos. La actinomicina D bloquea la síntesis de RNA.
(Cortesía de Duke Medical Center).

Ochoa decía que su mujer se había sacrificado por él. En una de sus últimas entrevistas realizadas en 1992 para *Epoca*, Ochoa decía que lo más importante de la existencia era el amor. Que su mujer le había dado todo el amor posible. Que ya no podía pedirle más a la vida.

Sobre la educación, tenía ideas claras y controversiales. Para Ochoa, la masificación producía mediocridad,(3). Ochoa no tenía convicciones religiosas y se mantuvo hasta el final pendiente de que la ciencia encontrara vida fuera de la tierra. Pasó varios veranos trabajando en Woods Hole,(44,45). La muerte de Carmen Cobián en 1986, lo afectó adversamente, al punto de la depresión. Desde entonces, nada le interesó e incluso consideró el suicidio.

Decían que tenía un carácter seco. Era evidente que detrás de su figura alargada, a lo "greco," como dice Kornberg,(48), se escondía una persona tímida. Quizá se debió a la muerte prematura del padre y a una sobreprotección por parte de la familia. No era tan abierto y tan bonachón como el Dr. Grande Cobián. Pero su biografía nos lo presenta como alguien que se ríe de todo fácilmente de sí mismo, incluso en un Convento,(15). Pasó a la historia como el descubridor de la fosforilasa de polinucleótidos, aunque su experimento de la espinaca era tan importante como la síntesis *in vitro* de los ácidos nucleicos.

Trabajó en la Universidad de Nueva York, (NYU), hasta 1974, en que se retira. Su oficina era la 353, en el cuarto piso. Vivió en el edificio Edgewater, al final de la calle 72 E., (en el No. 530), de Manhattan, en el décimo piso. Allí, continúa el vigilante en la puerta, con uniforme y gorra. Severo Ochoa es un recuerdo de la metrópoli. Decía Tico Medina que Severo Ochoa afirmaba de sí mismo,(3): "Me considero como de ninguna parte..." El Dr. Severo Ochoa falleció en Madrid, el lro. de noviembre de 1993.

La Fosforilasa de los polinucleótidos

Hacia 1950, la biología molecular crece a pasos agigantados,(30). Pocos laboratorios se dedicaban al estudio de los ácidos nucleicos. En Inglaterra encontramos el grupo de Markam y de Pirie. En Dinamarca, estaba el grupo de Kalkar. Los EE.UU. poseía el grupo fago, y otro capitaneado por Linus Pauling. En Nueva York estaba el laboratorio de Severo Ochoa.

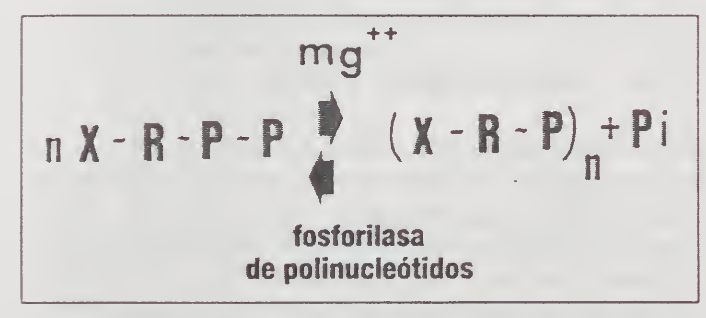


Fig. 6. Función de la fosforilasa de los polinucleótidos. X representa una base; R, representa una ribosa; P, representa un fosfato; Pi es fosfato inorgánico. Según Ochoa, la enzima no es muy "choosy", es decir, no es muy exigente, no escoge mucho. Tan pronto encuentra un difosfato, empieza a trabajar. Ochoa le dio el nombre de fosforilasa de los polinucleótidos porque de izquierda a derecha conduce a la formación de los polinucleótidos. Cuando Grunberg-Manago descubre esta enzima, Ochoa la reprende y le dice que mire bien lo que hacía, porque errores en enzimología no son permisibles. Había que purificar, como afirma Kornberg, (48). Ver Ochoa, (2) y Kornberg, (20).

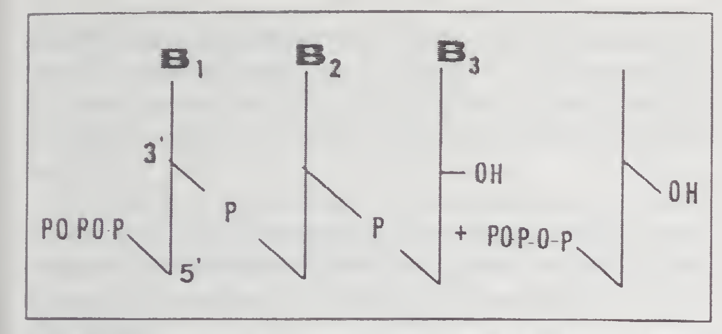


Fig. 7. Crecimiento de nucleótidos mediante la RNA polimerasa. La RNA polimerasa fija un nucleósido trifosfato en el cual elimina un pirofosfato sobre la cadena que crece. Hay esterificación del alcohol 3 de la última ribosa. El crecimiento va en dirección 5'-3'.

En el verano de 1959, se logra aislar un enzima de Azotobacter vinelandi, que es capaz de sintetizar polinucleótidos, a partir de 5'- nucleósido difosfato, con liberación de ortofosfato. La reacción es reversible y requiere magnesio iónico,(28). El ácido fosfórico es inorgánico pero en la naturaleza se comporta como si fuera orgánico,(2).

Hacia 1956 y luego en 1959, por vez primera se sintetizaban compuestos de alto peso molecular de tipo RNA-polinucleótidos, *in vitro*. Ello, abrió el camino para sintetizar los enzimas envueltos en la síntesis de proteínas.

Kornberg descubrió la función de la DNA polimerasa (20,29). La polinucleótido fosforilasa emplea tanto iones de Mg++ como de Mn++,(21). Esta enzima ha sido aislada a partir de bacterias y de células eucariotas. El resultado son polimerizaciones.

La mayor parte de los trabajos que se han hecho sobre polimerasas han tenido como origen E. Coli y B. Subtilis. La molécula de RNA doble puede separarse de su hebra mediante la técnica de centrifugación por gradiente de cloruro de cesio. El dogma de la biología

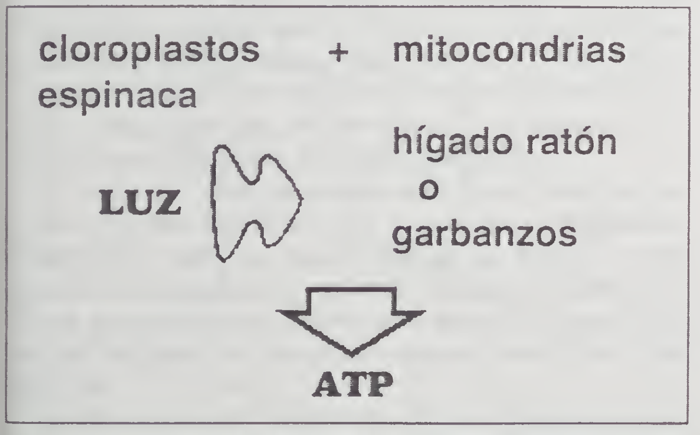


Fig. 8. Experimento de la espinaca de Ochoa y Vishniac. Ochoa mezcló cloroplastos de espinaca y mitocondrias de hígado de ratón. Al iluminar la reacción con luz, se producían uniones fosfato, ricas en energía. Al substituir las mitocondrias de hígado de ratón por mitocondrias de garbanzos, ocurría síntesis de ATP. El metabolismo es similar, hay una unidad en el esquema biológico.

molecular, (DNA-RNA-proteínas) se cumple en casi todas las circunstancias, aunque existen excepciones, (25,26). Una de estas excepciones la constituyen los virus RNA, (el virus del SIDA actúa así). Pero esta excepción es aparente. En los casos de los virus RNA existe una transcriptasa inversa: produce DNA para que el dogma se cumpla, (13,14,19,30,31,32,33).

Si consideramos la síntesis de DNA, esta molécula decimos que sirve de molde. El segmento sigma de la RNA polimerasa es responsable por la iniciación de la transcripción. La velocidad de síntesis de nucleótidos para nucleótidos, (base, azúcar y fosfato), es de 20 nucleótidos por segundo, (21). El final de la transcripción se debe a una serie de nucleótidos terminales, (stop), por ejemplo UUU. Además, hay un factor denominado (e), un tetrámero.

Los fagos, (colifagos), de tipo RNA se clasifican en los grupos F2, R17, MS2, (grupo I). Tenemos los

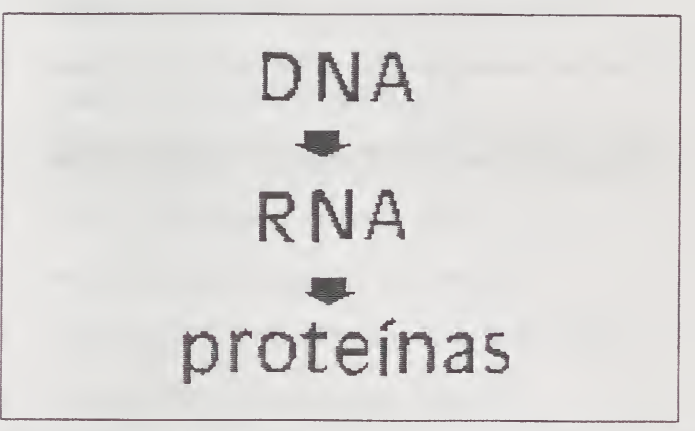


Fig. 9. Esquema general de las proteínas, (síntesis). Representa el dogma.

grupos II y III, (QB). La primera función del RNA de un fago es el funcionar como RNAm, (mensajero), (39). El RNA del fago se replica por un enzima RNA polimerasa. La replicación ocurre en dos etapas:

1- La replicación de una hebra, (molde); se necesitan los factores F1 y F2.
2- El mismo molde se emplea de nuevo, sin los factores F1 y F2.

El contenido de RNA en la célula eucariota es muy complejo, ya que existen moléculas heterogéneas de RNA, (hnRNA y RNA nuclear de bajo peso molecular, los SnRNA), (38). El precursor del RNAm es el RNA tipo hn,(43). El RNA hn es sintetizado en el nucleoplasma. Este RNA hn es destruido rápidamente.

La molécula RNAm se encuentra muy ligada a las proteínas. Los virus que poseen una sola fibra de RNA, utilizan el mismo material como RNAm al unirse al ribosoma,(47). El RNAt, (de transferencia), no es un producto simple de la transcripción sino que proviene de precursores de RNA de cadenas más largas, (36).

La enzima RNA polimerasa DNA dependiente ha sido aislada en varias bacterias,(42). La RNA polimerasa puede transcribir el DNA sin necesidad de

añadir otro componente. La capacidad de transcripción de la RNA polimerasa se debe a un promotor de un peso molecular,(PM) de 500,000. La reacción de polimerización tiene lugar a una concentración iónica baja,(42).

El modelo de promotor según Monod no es adecuado para explicar todo lo que sucede en la transcripción, (formación de RNAm a partir de DNA). Las drogas que inhiben la RNA polimerasa,(41), son las siguientes:

1-Rifampicina
2-Estreptovaricina
3-Estreptolidigina

La RNA polimerasa se disocia en dos partes:

1- Una parte de la coraza, (core)
2- El factor sigma, que inicia la transcripción.

El factor rho, (ρ) es responsable por la terminación de la transcripción. Para ello, es necesaria una concentración baja de iones. Existe discusión sobre la función del factor psi, (ψ). Los polipéptidos de la RNA polimerasa, son: β, β', α, σ, w, (41).

La subunidad es esencial como promotora e iniciadora, (42). La proporción de estas unidades o subunidades es de, con excepción de la subunidad alfa, (α), cuya proporción es de 2. La RNA polimerasa contiene unión Zn ++ en su centro. Es una metaloenzima. Se inhibe por acción de la o-fenatrolina. Existen holoenzimas que carecen de la unidad sigma, (σ). El fago T7 contiene una molécula de DNA lineal.

Los inhibidores de la síntesis de RNA son varios pero la actinomicinaD es empleada ampliamente. La rifampicina se une a la RNA polimerasa, inhibiendo la traducción. Además, tenemos la estreptolidigina.

La molécula de RNA, al comenzar su síntesis, comienza por un lugar específico del DNA, denominado promotor, (promoter). En E. Coli, el 3% del RNA es de tipo RNAm, (mensajero). El RNA ribosómico constituye el 0.4%. La enzima RNA polimerasa se fija a zonas silenciosas del genoma,(34). Se piensa que existe más de un lugar donde fijar la RNA polimerasa en el genoma. La rifampicina se emplea para dilucidar el lugar de fijación.

El fago T7 puede emplearse para estudiar la transcripción del RNA. Si se añade rifampicina, (rifampin), toda la transcripción se lleva a cabo gracias a la enzima proveniente del fago T7, (no de la célula procariota). Se estima que de 80-100 moléculas de polimerasa son necesarias para transcribir cada gen,(34).

En el caso de los poliovirus RNA, estas moléculas trabajan con un rol doble: como RNAm, (mensajero) y como molde para fabricar más RNA, (35). Se necesita de la enzima transcriptasa inversa, descubierta por el equipo de David Baltimore. El mecanismo que inhibe la síntesis de proteínas de la molécula huésped cuando un fago invade, constituye un misterio.

En el caso del DNA, la polimerasa puede fabricar 100 billones de moléculas en una tarde, (25). Ochoa encontró que en la síntesis de polipéptidos se necesitan factores de iniciación F1 y F2, (17). En este caso, emplearemos la nomenclatura F1 y F2. Tanto en la síntesis de RNA como de proteínas el control es muy específico, tanto en términos de locus o lugar como en términos de cofactores y de síntesis.

Se necesitan unos factores de iniciación para la síntesis de proteínas, (2,17,30,31,40): IF-1, IF-2, IF-3, (initiation factor, en la nomenclatura de Ochoa). El IF-3 ó F3, une el RNAm a la subunidad 30s. El IF-2 une el RNA al complejo 30s y al RNAm,(40). El factor IF-1, (F1), actúa como catalizador del IF-2.

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Articulos Originales:

Evaluation of sleep disorders: The San Juan VA Medical Center experience

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Summary: **The medical records and polysomnographs of 30 patients evaluated from 1986 to 1992 at the San Juan Veterans Hospital were revised. The data showed that 63.3% of cases suffered from sleep apnea. The majority of them (86%) presented other medical conditions. This data suggests that all of the physical health factors should be considered when evaluating the severity of sleep disturbances.**

Approximately 19-20% of the general population suffers from some type of sleep disorder (1,2). In reality this is not a single entity, but actually constitutes several related disorders which can be confused by the physician unfamiliar with sleep physiology. Sleep disorders include sleep apneas, disorders of the biological clock, nocturnal myoclonus (periodic movements of sleep), narcolepsy, psychophysiologic disorders, and REM behavior disorders among others. The most frequent clinical manifestations include excessive daytime somnolence, poor performance, behavioral disturbances and other constitutional symptoms. These patients usually have other systemic medical illnesses which may aggravate the sleep disorder. Making a correct diagnosis as well as understanding the specific neurobiology of each sleep disorder is fundamental for optimal therapy and adequate use of medications (3,4). The chronicity of the illness affects the patient's family as well as his social and economic well being.

We reviewed the medical records and polysomnograms of 30 consecutive patients seen at the San Juan VA Medical Center from 1986 to 1992. This was done to determine the reasons for referral, the frequency of different types of sleep disorders and also the presence of any other medical illness in addition to sleep abnormality.

Methods

All polysomnographs were reviewed. This study consisted of measuring multiple electrophysiologic parameters for an entire night. The principal monitor used was the electroencephalogram (EEG) which measured spontaneous nocturnal brain activity. Other monitors included the electromyogram (EMG) which measured nocturnal muscle tone and the electrooculogram (EOG) which measured ocular motility. Additional monitors were used to measure nasal air flow, thoracic and abdominal respiration, body movement and oxygen saturation. All monitors were connected to a 25 channel model 8-24D Grass polygraphic machine specially adapted for polysomnography.

The EEG was done using the International 10-20 system of electrode placement. Both bipolar (using scalp C_3, C_4 and 0_1, 0_2) connections and ear reference electrodes were used. The EMG was performed with electrodes on the chin and the EOG with electrodes in the supraorbital and infraorbital regions referred to the ears. Respiratory monitors were placed on the abdomen and chest muscles. Nasal air flow was monitored with an electrode transducer. Movements were monitored in the lower extremity with electrodes in the anterior tibial region. Oxygen saturation was monitored with an Omega ear oxymeter and the signal was passed to one of the D/C amplifiers specially adapted to register the signal in one of the channels. Next day, a multiple sleep latency test was done consisting of four 20-minute segments of EEG recordings at two-hour space intervals.

The polysomnograms were analyzed according to the recommendations of Rechtschaffen, A. and Kales, A. (5). Sleep apnea was considered when the patient had an index of more than five apneas per hour. Myoclonus was considered when there were more than four myoclonic episodes in 90 seconds. REM Behavior was considered when the patient had more than one episode of nocturnal behavior in REM sleep. Poor sleep efficiency was considered whenever the index for time in bed versus time slept was less than 80%.

Results

Thirty polysomnograms were reviewed. These were performed from 1986 to 1992. The patlents' ages ranged from 25 to 70 with a mean age of 54.8 years. The highest distribution of sleep disturbances was in the 46 to 65 age group (55%). The 25 to 45 age group

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had 27.5% sleep disturbances and the older group (over age 66) had 17.2%. The majority of the patients were referred to our laboratory for evaluation of suspected sleep apnea. The second cause for referral was diurnal somnolence followed by insomnia. The relationship between the most common reasons for referral and the most common final diagnosis is shown in Table I. The majority had more than one reason for referral. Of all the patients referred with sleep apnea, 63% had a final diagnosis of sleep apnea;

Table I.
Relation between most common reasons for referral and final diagnosis*

Reason for Referral	Final Diagnosis			
	Sleep Apnea	Low Sleep Efficiency	Periodic leg Movements	REM Behavior Disorder
Sleep Apnea	63%	18%	9%	9%
Diurnal Somnolescence	72%	0%	29%	0%
Insomnia	50%	25%	25%	0%

**The majority of patients had more than one reason for referral and many had more than one final diagnosis.*

18% had low sleep efficiency; 9% had periodic sleep movements and 9% REM Behavior Disorder. Seventy two per cent of the patients referred due to diurnal somnolence had a final diagnosis of sleep apnea while 29% had periodic sleep movements. One half (50%) of the patients referred with insomnia had sleep apnea and 25% had low sleep efficiency and 25% periodic sleep movements. Two patients referred due to behavioral sleep disorders had REM Behavior Disorder, while one of two referred with narcolepsy had sleep apnea. The most common sleep disorders in our laboratory are shown in Table II. Some patients had more than one sleep disorder. Sleep apnea accounted for 63% of total referrals. The majority of these (30%) had obstructive apnea. Mixed apnea was present in 20% of referrals and pure central apnea was present in 13%. Periodic leg movements were present in 20% of all cases. Behavior disorders of REM sleep were present in a surprising number of patients (13%). We had only one case of Klein Levin Syndrome, one case of narcolepsy and one completely normal study.

Table II.
Most commonly diagnosed sleep disorders

Diagnosis	No. of Patients	Percent
Obstructive Abnea	9	30
Mixed Apnea Predominantly Obstructive	6	20
Central Abnea	4	13.3
Low Sleep Efficiency	5	16.6
Periodic Sleep Movements	6	20
REM Behavior Disorder	4	13
Hypersomnia	1	3.3
Narcolepsy	1	3.3
Normal	1	3.3

Associated Medical Conditions

The recorded clinical history, medical and neurologic examination, and routine lab tests were reviewed. All patients had some other type of medical illness in additlon to a sleep disorder. Eighty-six per cent had 2 or more illnesses. Only three patients (10%) had a single additional illness. Thirteen medical conditions were found. Arterial hypertension was the most common illness (58%), followed by diabetes mellitus (35%), obesity (27%) and psychiatric illness (27%). See Table III. These were followed by bronchial asthma (19%), cerebrovascular disease (15%), atherosclerotic heart disease (15%), tobacco smoking (12%) and ethanolism (12%). Eight per cent had congestive heart failure and 8% renal disease. Parkinson's disease and Klein Levin Syndrome were found in 4% each.

Table III.
Medical conditions in patients with sleep disorders

Medical Conditions	No. of Patients	Percent
Arterial Hypertension	15	58
Diabetes mellitus	9	35
Obesity	7	27
Psychiatric Condition	7	27
Bronchial Asthma	5	19
Cerebrovascular accident	4	15
Atherosclerotic Heart Disease	4	15
Tobacco Smoking	3	12
Ethanolism	3	12
Congestive Heart Failure	2	8
Renal Disease	2	8
Parkinson's Disease	1	4
Klein Levin Syndrome	1	4

Discussion

In our study 55% of the patients are in the 46 to 65 age group. These observations are similar to those of other authors (6). In a significant number of cases the reasons for referral do not necessarily correlate with

the final diagnosis, which is the cornerstone for optimal therapy. This data demonstrates the clinical importance of performing polysomnography in patients with sleep disorders before starting any type of therapy. In our study, sleep apnea was the most common diagnosis (63%). The majority of apneas had some type of obstruction requiring continuous intermittent positive pressure therapy (CPAP). Other groups of diagnostic importance were Periodic Sleep Movements (20%), Low Sleep Efficiency (16.6%), and REM Behavior Disorders 13%.

Most of our patients (86%) presented two or more additional medical conditions. This may imply that overall physical health factors must be taken into consideration when evaluating the severity of sleep disturbances. Our data suggests that sleep disturbance is not necessarily an inevitable component of aging, perse, but a reflection of general physical health (7,8). The relation between sleep problems and physical health is the main focus of ongoing studies.

Resumen: Los expedientes y polisomnogramas de 30 pacientes consecutivos vistos en el San Juan VA Medical Center de 1986 a 1992 fueron revisados. La data demostró que el 63.3% de los casos sufría de apnea del sueño. La mayoría de los pacientes, un 86%, presentó otras condiciones médicas. La data sugiere que los factores generales de salud física deben tomarse en cuenta al evaluar la severidad de los disturbios del sueño.

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Congenital Infantile fibrosarcoma - like fibromatosis A Case Report and Review of the Literature

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María K. Amézquita, MD**
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Summary: We report a rare case of Congenital Infantile Fibrosarcoma-like fibromatosis from the left distal arm of an otherwise healthy neonate. A thorough review of the literature is done to support the hypothesis that surgical excision alone is the treatment of choice for these lesions when they originate in the extremities and are resectable.

Case Report

This is a 17 days old male patient, admitted to the Department of Pediatrics of the Mayagüez Medical Center, born by vaginal delivery after a full term gestation without complications and without family history of tumors. The Pediatric Surgery Section was consulted due to the presence of a mass of the left distal arm, discovered by his mother 6 days prior to admission and which was increasing in size since then. There was no redness or pain at the affected area, nor fever or trauma. On physical examination he was completely normal except for this left distal lateral arm growth of 2 x 3 cms., hard at palpation, painless and without redness. There was no joint or bone involvement as demonstrated by plain roentgenograms of left upper extremity (Fig 1). Left arm CT scan showed a soft tissue density mass in the lateral soft tissue of the distal arm. No bone involvement was present but we were unable to clearly rule out muscle involvement. (Fig. 2)

Needle aspiration for culture was reported to be negative Incisional biopsy performed at the same time of the needle aspiration showed a homogeneous gelatinous-like tissue of a yellowish color that microscopically demonstrated a hypercellular pattern which was mitotically active with minimal collagen production and local slit-like vascular space lesions that were similar to those found in congenital infantile fibrosarcoma-like fibromatosis.

In a matter of few days, after the incisional biopsy, the lesion grew about twice is previous size, therefore as soon as the pathologic report was known the patient was taken to the operating room for definitive treatment [Fig.3,4,5]. A wide excision of the tumor was performed, with the use of tourniquette and magnifying loops. In-toto excision of the mass, together with a skin ellipse of about 8 X 4 cm and encompassing from the skin to the muscle planes

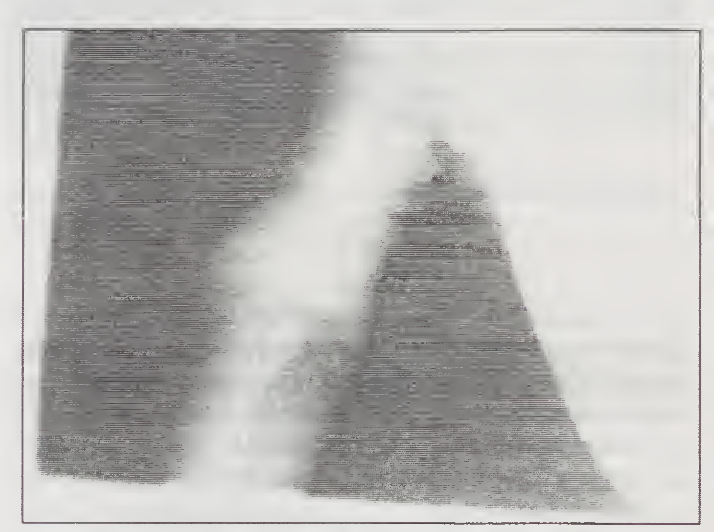


Fig. 1. A-P roentgenogram of left upper extremity, demonstrating the soft mass, without joint or bony involvement.

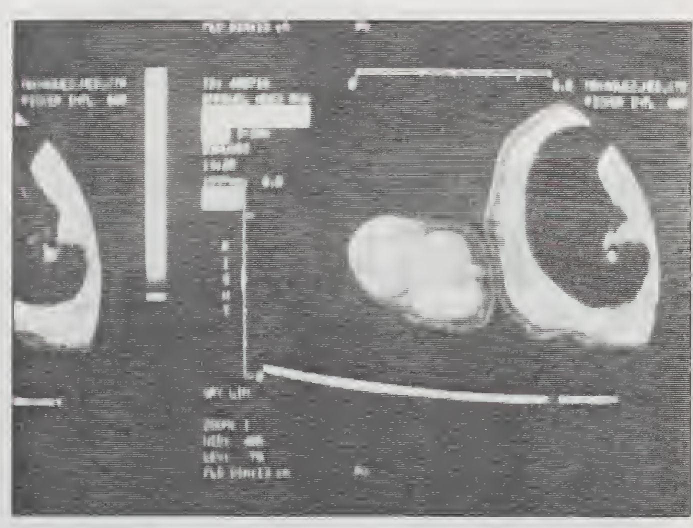


Fig. 2. C.T. Scan of left upper extremity, demostrating soft tissue mass of distal lateral arm, without apparent involvement of bone or muscle.

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Fig. 3



Fig. 4

underneath including superficial fibers of the distal Biceps and proximal supinator longus muscles was performed. No major nerves or vessels were injured. The bones and elbow articulation remained intact. Large skin flaps had to be developed to obtain adequate tissue approximation and to decrease tension at the suture live.

Gross description of the specimen sent to pathology was as follows: "Beneath the epidermal surface



Fig. 5

Fig. 3, 4, 5. Diferent views, demonstrating the tumor, just prior to Surgery.

there is a tumoral mass of 6 cm in diameter, of a yellow white color, rubbery in consistency, 2 cms from the cutaneous margin of resection and 2-4 mm from the deep muscular margins of resection. Microscopically the tumor was composed of fusiform and spindle fibroblasts showing arrangement in distinct intersection fascicles. Numerous mitotic figures were seen as well as slit—like vascular spaces(Fig. 6,7,8,9). Cutaneous and deep margins of resection were free of tumor. These findings confirmed the incisional biopsy preliminary diagnosis of congenital infantile fibrosarcoma-like fibromatosis".

The patient has been followed for over six months, presenting no evidence of recurrence and only limited weakness in dorsiflexion of the left wrist due to decreased muscle mass, for which he is currently undergoing physical therapy.

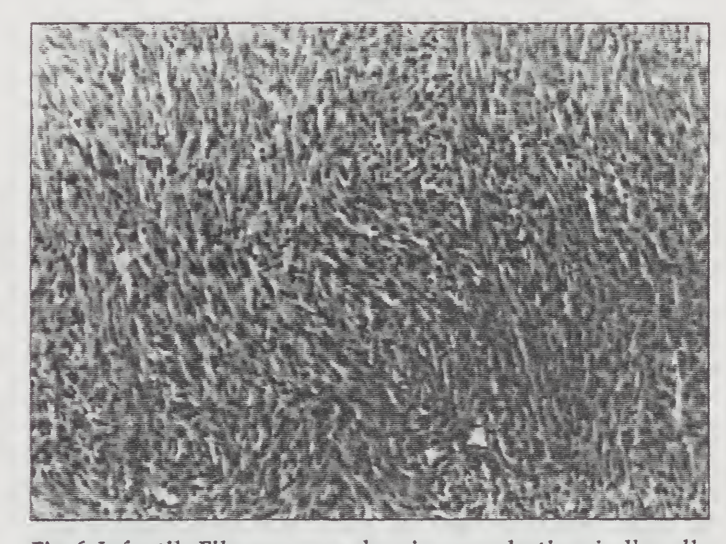


Fig. 6. Infantile Fibrosarcoma showing neoplastic spindle cells arranged in fascicles. Scattered lymphoid cells are noted (H/E X 20).

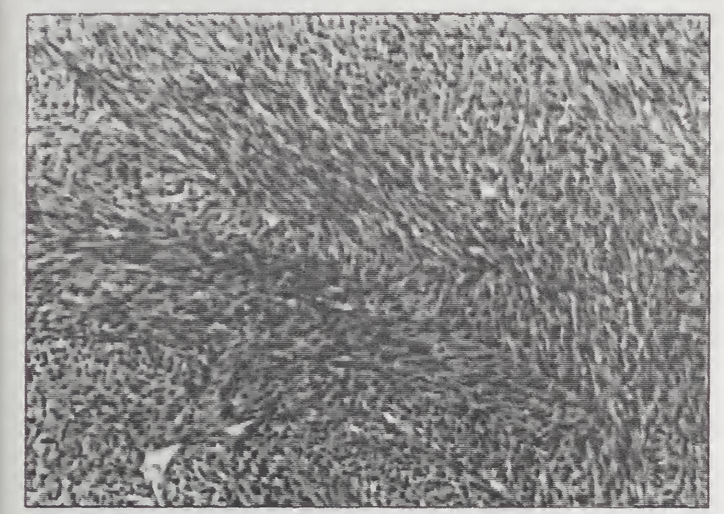


Fig. 7. Infantile Fibrosarcoma with greater degree of cellular differentiation. The picture shows plump spindle cells with a cellular "Herringbone" pattern resembling adult fibrosarcoma.



Fig. 8. Photomicrograph showing neoplastic spindle cells, extending into the dermoid tissue.

Discussion

Congenital Infantile Fibrosarcoma-like fibromatosis is a neoplasm of neonates that rarely metastasizes despite its often impressive gross dimensions and the equally distressing hypercelular, mitotically active lesions.[3,6,7,8,9,10] Of the patients with extremity primaries, 92 percent were free of metastatic disease and 95 percent were alive despite a 27 percent local recurrence rate. Thus a local recurrence of a Congenital Infantile Fibrosarcoma-like Fibromatosis arising on an extremity does not necessarily herald systemic spread of the tumor. In contrast lesions of the trunk appear to be more aggressive with 20 percent of patients developing metastases and 26 percent dying of their disease and 13 percent suffering local recurrence.

Although recent reports detail the benefits of preoperative chemotherapy in the treatment of Congenital Infantile Fibrosarcoma like fibromatosis[11,12] the main stay of treatment is surgical treatment by wide local excision usually without additional therapy. Because late local recurrences do not appear to affect overall survival conservative management aimed at maintaining as much function as possible and avoiding amputations is often the preferred approach. Because of the known long term consequences of radiation therapy and the potential early and late effects of chemotherapy, the use of these modalities in the local management of this disease entity is generally not advised, unless surgic removal is not possible.[13]

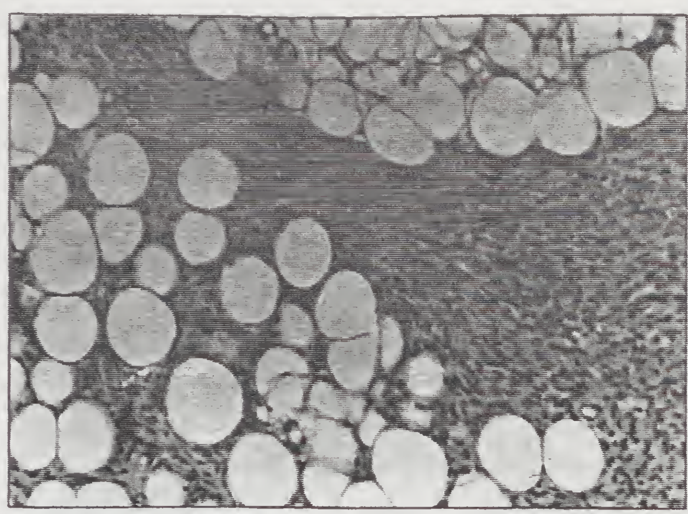


Fig. 9. Higher power of the tumor, infiltrating the subcutaneous tissue.

The role of chemotherapy in the adjuvant treatment of this entity has not been established, but several recent reports clearly document that at least some of these lesions are sensitive to chemotherapy [11,12]. Thus, for patients who have metastasis or unresectable primary disease chemotherapy is the initial treatment of choice.

Introduction

Congenital Fibromatosis is the major subgroup of fibroblastic-myofibroblastic tumors that are diagnosed in the congenital-neonatal period. Estimates vary, but 10% of myofibroblastic lesions of childhood are diagnosed at this time[1]. The subtypes of fibromatoses that may present at birth are: Congenital Fibromatosis, localized or generalized; Infantile myofibromatosis; Infantile Desmoid Type Fibromatosis; Fibromatosis colli; Infantile Digital Fibromatosis; Fibroma of heart; Fibrous hamatoma of infancy and; Congenital Infantile Fibrosarcoma like fibromatosis [2,3,4] the subtype of concern to us.

Congenital infantile fibrosarcoma-like fibromatosis does not present significant sex predominances and occurs more frequently on the extremity, often in the distal segments: 70% of the reported cases of congenital fibrosarcomas occur at this site.

We report a case of a Newborn with a left distal arm

mass that was found to be a congenital infantile fibrosarcoma-like fibromatosis. A review of the literature concerning the surgical management of this lesion is presented.

Conclussion

Congenital Infantile Fibrosarcoma-like Fibromatosis is a neoplasm of neonates with often impressive gross dimensions and rapid growth. It is a hypercellular, mitotically active lesion, with nuclear pleomorphism and sometimes anaplastic tumor cells. However, this entity when originating at the extremities rarely metastasizes and late local recurrences do not appear to affect overall survival of patients. Wide local excision alone is the treatment of choice unless the tumor is unresectable in its primary, recurrent or metastatic presentation.

Resumen: **En este artículo reportamos un caso de Fibromatosis Cuasi-Fibrosarcoma Congénito Infantil en la parte distal del brazo izquierdo de un neonato. Se presenta revisión de la literatura para sostener que el manejo quirúrgico por sí solo es el tratamiento de elección de esta lesión cuando se presenta en extremidades y es resecable.**

Index Words
Congenital Fibromatosis
Fibromatosis
Soft Tissue Tumors of Infancy

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Artículos Originales:

Cardiac Pacemaker Tachycardias - Part III

Charles D. Johnson, M.D., FACC

Summary: **This work addresses, discusses and review the many types of tachycardias associated with cardiac pacemakers, with which the modern physician may be confronted. Emphasis is laid upon the differential diagnostic aspects of these complex tachyarrhythmias for today's practicing physicians, since accurate diagnosis is the keystone for a proper approach to management. A didactic approach and departure is assumed in an effort to organize, outline and simplify to the extent possible, a vast, inundating complex field of medicine.**

Key Words: Pacemakers: Cardiac Pacing; Tachycardias.

46. Rate Responsive, Rate Adaptive, Rate Modulated Sensor - Driven Pacing

Introduction

Rate Modulated Pacemaker - a pacemaker that is able to change or adjust its stimulation interval and rate by sensing a physiological function other than the intrinsic atrial rhythm/based on input from a biological sensor.

AIR - atrial - indicated rate.
AR - the atrial rate.
A-R - an atrial paced event followed by intrinsic ventricular depolarization.
ARI - atrial refractory interval.
MIR - the metabolic indicated rate.
MSR - maximum sensor rate - the maximum rate at which the sensor can drive the pacemaker.
MTR - maximum tracking rate.
SDI - Sensor - driven interval.
SDP - Sensor - driven pacing.
SDR - Sensor- driven rate.
SIR - Sensor - indicated rate.
Closed-loop sensor - a sensor that responds only to metabolic need.
Open-loop sensor - a sensor that responds to something other than metabolic need. (174 - 182)

A. ECG VVIR, AAIR Single Chamber Rate-Modulated pacing (RMP)/SDP. AV dissociation, a variable pacing rate and according to sensor operation different stimulus intervals (automatic and post-sensed beat) can be observed; the R-R intervals, V-V/A-A cycle intervals vary; the LRI is variable and varies as the SDR varies (the programmed LRI or the constantly changing sensor-driven LRI, whichever is shorter); the pacemaker Escape Intervals (EI) change and during sensor operation can be abbreviated; the shortest sensor-driven LRI is equal to the programmed URI.

The timing cycle consists of a LRI, an URI and a VRP - the basic VV (or AA) interval and a RP from the paced or sensed event. The sensor is not sensitive to a stimulus visible on the ECG. VVIR pacing provides rate response, but no AV synchrony. (6,13,164,174-175,177-182).

B. **Dual-Chamber DDDR Pacemakers**

a. The rhythms may be:
   1) Sinus-driven/Atrial-driven/P synchronous
   2) Sensor-driven.
      3 channels of sensitivity: ventricle, atrium, additional sensor(s).

b. Lower Rate (LR) /Base Rate Behavior:
   1. Ventricular-based timing.
   2. Atrial-based timing.
   3. A hybrid of these; Modified AA timing.
      The Base Rate Behavior may affect the UR Behavior.
      The LRL is an atrial EI.

c. DDDR UR Behavior
   3 different URL's:
   1. that determined by atrial refractoriness alone.
   2. that set independently of atrial refractoriness, always beneath #1.
   3. an URL based on the MSR.
   All three may be the same or different.

   2 stimuli set the URL:
   1. If the SDI is shorter than the atrial coupling (the AR) the atrium will be paced. If AV conduction occurs from the spontaneous or paced atrial event, the ventricular stimulus will be suppressed.

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2. If the atrial coupling interval is shorter than the SDI, it will take precedence and the sensor rate modulation and spontaneous atrial snychrony will occur. The URI is driven by the sensor and by the atrium, which is sensed or paced depending on whether sensor-drive or atrium is at the shorter interval.

   The MTR (UTR) and the MSR may be a single programmable URL in some pacemakers, while other pacemakers provide a separable, independently programmed MTR and MSR.

d. There may be 3 different AVI's:
   1. Sensed AV interval (SAV).
   2. Paced AV interval (PAV).
   3. Additional: a) differential AVI or AVI hysteresis.
      b) Rate variable or Rate Adaptive AVI (RAAVD).

Rate Adaptive PVARP.

DDDR pacing provides rate response and AV synchrony.

C. **Dual-Chamber RAP ECG**

The rhythms may be in part **sinus-driven** and in part **sensor driven**, one or the other as an interplay.

1. Normal DDD operation - A and V pacing, P synchronous.
2. P synchronous pacing - SDR< AR.
   tracking with synchronized pacing in the ventricle.
3. Sensor-driven atrial pacing and antegrade conduction - the intrinsic AR < SIR, or if the intrinsic atrial beat falls into the ARP and is not sensed.
   AV sequential pacing, as SDP in both chambers - SDP> AR.
4. Pseudo-Wenckebach Block
5. 2:1 AV Block, via TARP ⟶ SDR < AR
   Atrial tracking above the UR, with ventricular pacing at or below the UR.
6. Combinations, such as Wenckebach and Fallback. Atrial tracking may alternate with sensor-based pacing.
7. The AV - AV intervals vary.
8. AV sequential pacing manifests between the pLR and the URL.
9. In DDDR pacing there is the ability to pace the atrium during the PVARP, and sensing cannot (but not in the DDD mode). Even though the atrial sensing channel is refractory during the PVARP, sensor-driven atrial output can still occur. (174-182).

D. Sensor-Driven Rate Smoothing: means a physiologic smooth transition at the URL when the intrinsic AR exceeds the MTR, between an intrinsic sinus/atrial-driven rate/P synchronous and the SDR/SDP AV sequential pacing, to prevent URL fluctuations in R-R cycle length (avoiding 2:1 block and avoiding or limiting a Wenckebach response, thus eliminating a precipitous drop in the ventricular rate at the URL). Moreover, there will be no difference in the cycle lengths between P synchronous and sensor-driven AV sequential pacing. Instead of skipping a ventricular beat, the PG delivers A and V stimuli at the sensor-based interval. A P wave falling within the PVARP is not sensed and is blocked, but the escape event is a sensor-driven A stimulus followed shortly by a Vp after the AVI, so that the pause after the nonsensed P wave in Wenckebach is shortened by SDP. This is accomplished by optimal programming of the rate response parameters.
(174,177-178).

47. **PMT's in Rate Adaptive Pacemakers. Sensor Mediated Tachycardias (SMT's)**

Are tachycardias generated by unphysiological, inappropriate activation of a physiologic sensor; they occur when the sensor-determined rate is higher than the requirement of the physiological condition. An inappropriate increase in the pacing rate may result from:

a. A reflection of the imperfect specificity and proportionality of the sensor to discriminate noise from the physiologic metabolic changes and signals the sensor is supposed to detect.
b. Technical failure, component failure; sensor runaway, sensor idiosyncrasy.
c. Inappropriate programming or setting-up of the rate algorithm; programming excessive sensor sensitivity/over-responsive.

Sensor Feedback Tachycardias - self-perpetuation as a positive feedback loop; Sensor activation an increased pacing rate activation of the sensor.
(174-176, 181-183).

48. **Sensor-Driven Single- Chamber SMT's.**

a. VVIR pacemaker tracking at the URL.
b. VVIR potential retrograde VAC that induces tachyarrhythmias. Af may develop in patients with SSS (76).
c. Myopotential inhibition and bradycardia in a unipolar system, followed by a ventricular triplet.
d. There is the theoretical risk in VVIR modulated pacing that a short SDI could allow release of a V stimulus into the VP of a preceding VE

(regarded by the pacemaker as a Refractory-sensed event) and produce ventricular tachyarrhythmias.

1. **Activity Sensor**
(Medtronic Activitrax and Legends, Intermedics Dash, Siemens-Pacesetters Sensolog)
May show frequent nonphysiologic rate increases in scenarios of high levels of ambient Vibrations and Motion: riding in a car over rough terrain or bumpy roads, bus, tractor, motorcycle, train, small aircraft vibrations, helicopter, horseback riding, jackhammer; External pressure on the PG: sleeping prone on the chest or abdomen, positional changes as turning in the bed, flexion of the muscles in region of the PG, vigorous surgical manipulation, positioning programmer head over the PG, driving a car with the shoulder strap seat belt over the PG, scrubbing movements, carrying a suitcase by the ipsilateral arm, tapping over a piezoelectric PG; an epileptic seizure/chorea/myotonic jerking; postoperative shivering resulted in a persistent PT, and anxiety-provoked shivering resulted in a pacing rate of 120 ppm; cyclosporine-induced tremors in a cardiac transplant patient; slight rate increases result from loud rock music (large amplifiers and ultra-low frequencies near 20 HZ). (186).

Sensor Feedback Tachycardias: A flipped-over, unipolar Activitrax PG caused pocket-pacing and local muscle twitching which activated the sensor to produce a faster rate response - a positive feedback augmentation in the rate as a closed, positive feedback loop- which was managed by lowering the output to 2.5 V (183). Dental drilling treatments can influence the Activitrax system, leading to rises in the pacing rate up to 96 and 140 ppm (150, 187).Activitrax piezoelectric crystal activity during Lithotripsy led to stimulation up to the maximal activity pacing rate of 150 ppm (117, 150-152).
An inframammary Activitrax VVIR 8400 PG induced inappropriate, rapid pacing up to the pUR (patient had palpitations at rest), because of its position over the apex of the heart where it sensed the cardiac contractions - cardiac apical thrust mechanical stimulation (188). Figure 1.

TENS. Ablations.

Rate Adaptive Atrial Pacing/AAIR - may overstimulate and cause fast pacing rates, and induce atrial tachyarrhythmias. These high pacing rates may result in ventricular tachyarrhythmias. Accelerometer-driven rate adaptive devices, such as used in newer Intermedics rate adaptive systems are less sensitive than piezoelectric sensors to these influences and may result in less SMT's. Irregular pacing intervals during higher rates more than 120 ppm may occur with Activitrax 8400 units, due to electrode polarization potentials resetting the pacing interval by 80 ms. (50, 174-176, 179-190).

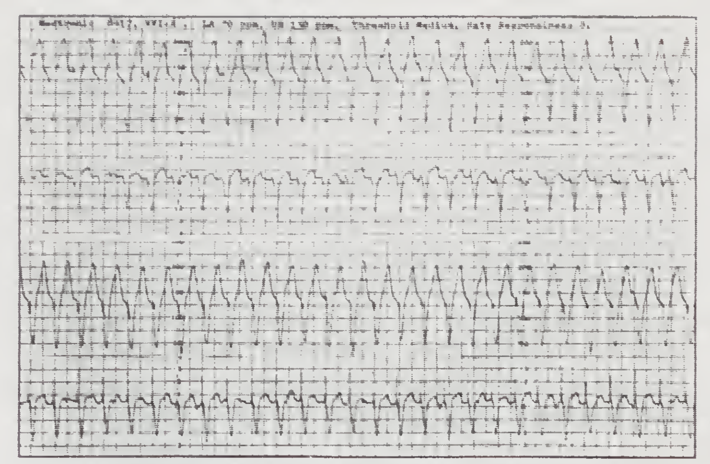


Fig. 1. Congenital AV block. Palpitations. Medtronic VVIR. A sensor-driven V paced rate up to the URL of 150 ppm. Malprogramming too sensitive, and/or sensor detection of the cardiac contractions.

2. **Respiratory Sensor**
Ventilatory Rate (Biotec Alpha, Biorate) > Intra-thoracic impedance.
Ventilatory Volume, Minute Ventilation (Teletronics META MV)
Can lead to inappropriate rapid pacing rates from: voluntary or hysterical hyperventilation, talking, coughing, tachypnea from chest infections or congestive heart failure, Cheyne-Stokes respiration, mechanical ventilation, movement or swinging of the arm or shoulder on the same side as the PG, electrocautery and general anesthesia with an increase in ventilation. Hyperventilation during general anesthesia may induce PMT, as a paroxysmal tachycardia and hypotension (190). Such a metabolic, rate-responsive VVI-R unit caused transient UR ventricular stimulation at 150 ppm during electrocautery, at the beginning of an open heart surgical procedure, accompained by a prominent fall in blood pressure and hemodynamic deterioration. Heart massage and manual ventilation also initiated the tachycardia. The PG should have been programmed to the VVI inhibited mode prior to surgery (192).
A META MV device resulted in VT's in the recovery period after a Treadmill test, when the paced rate reached 150 ppm (185). (13,174-176,180-185,189-193).

3. **Temperature Sensitive SMT**
(Cook VVIR Kevin 500, Intermedics Nova MR)
Augmented pacing rate up to the UR secondary to:

a. Inappropriate programming - Temperature response programmed overly sensitive.
b. Technical failure - Thermistor or PG failure can possibly cause UR pacing. PG malfunction may result in Torsade from firing on the apex of the T wave.
c. External temperature change of a very hot tub bath; Internal temperature change of hot drinks and congestive heart failure.
d. During fever, eating, emotions and nervousness.
e. A patient experienced diaphragmatic pacing, resulting in a higher central venous/RV blood temperature which was sensed by the sensor; this led to sustained UR pacing - as a self-perpetuating loop. Management comprised decreasing the ventricular output to avoid diaphragmatic pacing (194). These tachycardias will terminate once the sources of interference are removed. (174-176, 183-185, 189-190, 194).

4. **QT Sensors. Endocardial Evoked Potential/ Stimulus to T/Ventricular Repolarization.** (Vitatron Quintech).
Exercise and stress cause QT shortening. Emotions, adrenergic stimulation, drugs, electrolyte changes, myocardial ischemia, psychological and mental stress and nocturnal dreaming may lead to an increase of the pacing rate; An increase in the pacing rate again shortens the QT - a Feedback Tachycardia. Excessive adrenergic tone in AMI may cause URL pacing (184). The Oscillation phenomenon - a spontaneous acceleration in rate in the absence of activity, or inappropriate postexercise tachycardia. (174-176).

5. **Ventricular Depolarization Gradient (VDG)/ Integral/Evoked QRS Response.**
(Teletronics -Cordis Prism CL).
There is a tendency for the paced rate to increase when recumbent; an inappropriate HR increase after changing bodily position.

6. Right Ventricular Stroke Volume
Right Ventricular Pre-ejection interval, Ejection Time. CPI Precept
An increase in HR in coronary artery disease and LV dysfunction patients on assuming the upright posture. Mixed Venous Oxygen Saturation; PH. RV Pressure 1st Derivative/ dP/dt. (174-176).

49. **Dual-Chamber Pacemaker SMT's.**

A. The reported incidence of atrial arrhythmias in DDDR pacing during FDA trials ranged from 8-10%. There was a 2% incidence of these, including Af, short term (3-4 months). Spencer et al found no significant increase in atrial arrhythmias in the DDDR mode compared to DDD mode pacing. It has been stated that in most cases ELT is a nonissue. DDDR pacing can minimize or prevent some complications of DDD pacing. (195-200).

However, both atrial and ventricular tachyarrhythmias may complicate DDDR pacing. PMT's similar to those observed with DDD pacing can occur, and ELT can occur when the system operates in the DDD mode. A DDDR system may track rapid intrinsic SVT's, leading to irregular tachycardias at or below the URL, and Wenckebach operation.

An increase in the rate adaptive paced AR must be distinguished from PMT by identifying the notated delivery of the atrial output pulse. (106,116,117,182,198-200).

B. DDDR Inappropriate Increases in pacing rate:
(Medtronic Synergyst, Elite; Intermedics Relay) Technical failure.
Environmental vibrations - travel, car, etc. External pressure. General anesthesia. Electrocautery. Lithotripsy. (106,116,117,176,189-190,198-199).

C. Respiratory Minute Ventilation (META DDDR).
A programmer software problem can cause pacing at the maximum rate limit. In one batch a SMT resulted from insulation failure in the atrial negative terminal.
Inappropriately rapid pacing rates may result from sensitivity to motion artifacts such as swinging the arms, coughing and hyperventilation, electrocautery, electrical interference (paced at the UR at open-heart surgery), internal heart massage and manual ventilation (at UR at open-heart surgery), invasive procedures, hypothermia, lithotripsy. If the META DDDR determines a nonphysiologic atrial tachyarrhythmia, the pacing mode changes to the VVIR mode. (174-176, 189).

D. DDDR - A QRS beat or VE falling during the BP (nonsensed) can result in the V stinulus being delivered during the ventricular repolarization VP of the preceding premature beat and induce VT or Vf. Atrial arrhythmia induction by an atrial ectopic beat falling in the ARP closely followed by an atrial event in the VP of atrial repolarization governed by the sensor, led to Af.

E. Feuer and coworkers warned that DDDR pacing may be associated with a high incidence of atrial tachyarrhythmias compared to DDD pacing whenever an unsensed P wave fell in the PVARP closely followed by a sensor-initiated atrial stimulus delivered during the atrial VP (197). In DDDR and DDIR pacing there exists the small potential for competition between intrinsic atrial and sensor-driven atrial depolarization-atrial competition and loss of AV synchrony- to

produce Af and atrial tachyarrythmias, because an atrial stimulus (A) can be delivered close to an unsensed P wave during the PVARP of the previous beat (when the sensor-modulated pacing interval decreases to the point that exceeds or almost exceeds the TARP) of SDP, if the sensor-driven atrial output fall within the VP of atrial repolarization- there is close coupling between any intrinsic atrial refractory sensed event and a subsequent atrial paced event. While an intrinsic atrial event cannot start a SAV during the PVARP, a sensor-based atrial stimulus can still be delivered. This scenario of: a spontaneous atrial depolarization, APB, falling in the terminal portion of the TARP (unsensed) - followed closely by a sensor-driven atrial output stimulus which occurs earlier than the expiration of the AEI - this A stimulus can potentially fall in the VP of atrial repolarization - with the potential for inducing atrial arrhythmias. There is the similar potential for atrial competition when a sinus tachycardia results in spontaneous P waves falling in the TARP.

Rate Adaptive Pacing (RAP) faster atrial pacing rates may favor high rate competitve atrial pacing and arrhythmias, and the faster ventricular pacing rates may favor the induction of sustained or nonsustained VT (176-177,182,197).

F. The programming of two disparate UR's (atrial-driven URL and sensor-driven URL) carries the theoretical risk of precipitating atrial arrhythmias.

At rapid SDR's the Atrial Sensing Window (ASW) disappears and the pacemaker operates as DVIR.

G. SVT's occur in DDIR and DVIR mode pacing; DVIR pacing has the potential for competitive atrial rhythms. Figure 2.

In DDIR mode ELT may occur at the SDR (during DDI pacing ELT, without tachycardia, occurs at the LR).

H. DDDR pacing may result in AVDA/Repetitive Non-reentrant ventriculoatrial synchrony during exercise as the sensor-driven increase in pacing rate shortens the AEI.

I. SDR Smoothing could potentially cause atrial arrhythmias when atrial stimulation occurs with a short P - stimulus interval. (174-176, 182, 190, 199).

J. Lau (201) reported a case in which myopotential sensing resulted in asynchronous ventricular pacing that caused VAC with rP' wave that was sensed. A magnet was ineffective in termination since the rate of the DOO pacing was close to the rate of the PMT and the atrial pacing occurred within the RP induced by the rP' impulse. The PMT was terminated by overdrive pacing by external tapping on the piezoelectric sensor PG; this resulted in DDDR pacing at an augmented SDR that led to effective atrial capture, AV sequential pacing and termination.

K. DDDR Pacing above the programmed MTR. Circumvention of the MTR.
   1) Violation of the UR during VSP; VSP activation by ventricular sensing.
   2) In a Ventricular-Based Timing system the effective Atrial paced rate can be significantly higher than the programmed MSR/URL when the MTR and the MSR are not independently programmable, if A-R conduction were present, due to ventricular inhibition.

      Rate acceleration can be minimized by incorporating RRAVD (which provides a more physiologic AVI at faster rates).
   3) A ventricular response may exceed the MTR, if the native atrial rate exceeds the pMTR and if the MSR> MTR.

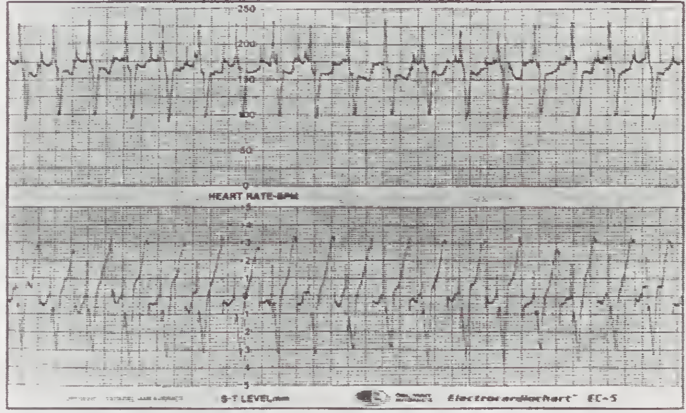


Figure 2. Post-operative Tetralogy of Fallot 2 °AV block. RBBB, SVT's. Palpitations, chest discomfort, tachycardias. Medtronic DDDR 7071 Synergyst II programmed to DVIR. LR 50 ppm, UR 150 ppm, AVD 150 ms (PAV 250 ms, SAV 230 ms), Atrial threshold 7, Rate Response medium, Refractory 250 ms, Atrial Blanking 125 ms. Rapid AV sequential pacing and atrial competition (P wave) during the DVIR mode pacing.

   4) Apparent (pseudotracking) P wave tracking above the MTR or TARP rate based on sensor activation as an appropriately timed P wave in the ASW can still inhibit the sensor-driven atrial pacing artifact/output spike (Higano & Hayes), with P wave tracking at the SDR.
   5) By automatic reduction of the TARP (shortening of the PVARP and abbreviation of the AVD/PR at faster rates).
   6) Pseudo-rate smoothing between the MTR and 2:1 block rate.
   7) AV pacing above both the MTR and 2:1 block rate (Hanich).
   8) AV sequential pacing above both the MTR and 2:1 Block rate.
   9) AV sequential pacing at a rate faster than the programmed Base rate during DVIR pacing.

In the Intermedics Cosmos PG there is an extension of the AEI/ a VA extension of 300-400 ms/pause at the URL or end of a Wenckebach period, in order to avoid the artificial increase in AR of other PG's. (199, 202-203).

In certain DDDR systems, Automatic Mode Switching (AMS) occurs on detection of SVT's (nonphysiologic Af, AF, AT) or an APB sensed during the ARP or P-P interval- the operational TARP, changing from the DDDR mode to the VVIR mode (META). A comparison of atrial and sensor activity. CTL of the Intermedics Relay. (177,182,203).

50. **Anti-Tachycardia Pacing (ATP)**

ATP carries the potential to induce additional cardiac arrhythmias-proarrhythmic. A stable ventricular arrythmia may be accelerated or converted to a more malignant arrhythmia, such as VT to Vf. Retrograde AP conduction might play some role. ATP for SVT's can cause Af or AF (in 8% of attempts, up to 34% of patients), or change the type of a SVT - AF to Af, or accelerate the existing tachyarrhythmia. High rate atrial pacing in the presence of an AP allowing rapid 1:1 AV conduction, could result in a disastrous malignant ventricular tachyarrhythmia.

SVT's induced by a. Undersensing, of an APB, and b. Oversensing, of extraneous electromechanical potentials; triggering; or a ST faster than the pacemaker triggering rate.

Burst pacing caused SVT during pectoral muscle movement. Burst pacing due to faulty sensing or in response to ST may induce/initiate Af. If ATP is used to treat ventricular tachycardia, VT could result. Faster and longer pacing is more likely to accelerate a tachycardia (as well as to terminate it).

A DVI, MN pacer induced a RT. A DVI, MI pacer caused an AV RT in the magnetic mode by delivery of the first A and V in the cycle when the ventricles were refractory, but the atria could be stimulated to a P impulse capable of being conducted to the ventricles with sufficient delay to initiate it. a DDD, MB pacer producd a short burst of Af on delivery of a burst of stimuli. (4,5,7,26,30,204-209). Esophageal Pacing - has rarely caused Af, a high ventricular rate, VT and Vf (210).

51. ICD Devices

ICD-related tachycardias.

During the early post-implant period of the ICD there may be an exacerbation of ventricular arrhythmias.

Magnet application over a VVI unit leading to asynchronous VOO stimulation, has triggered VT.

Magnet misdirect. Random component failure.

Can re-initiate the venticular arrhythmia; a stable VT rate could be augmented or converted to an unstable arrhythmia of Vf; could re-initiate another arrhythmia such as Vf.

ICD - ATP interactions - Limitation of automatic arrhythmia recognition, resulting in Af, and SVT being mistaken for VT and the device delivered/ triggered ATP therapy which induced VT, requiring additional therapeutic intervention by a defibrillator shock. In the newer cardioverter-defibrillators (3rd generation), with additional bradycardia and ATP features (such as the co-dependent Cadence device) there is a possibility of induction of VT as a result of transient failure caused by an abrupt change in the amplifier gain setting and by spontaneous variations in signal amplitude, when paced beats follow single nonsensed cmplexes - Sensing errors. 3rd generation "Endless VT" loop. (5,7,26,174,207,212-213).

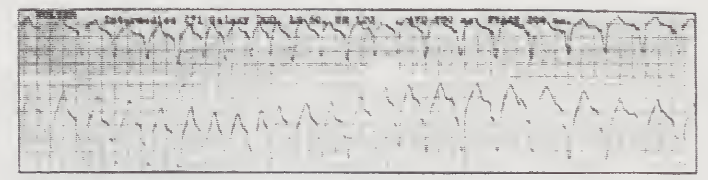


Figure 3. Congenital complete AV block (Same case as No. 12 II). Equipment artifact. The paced ventricular rate is variable and reached a maximal rate of 205 ppm, far above the pUR/VTL of 120 ppm.

52. Pacemaker Implantation

Catheter lead manipulations in the heart can produce supraventricular (Af, AF, AT) and ventricular (VE's, Vf) tachyarrhythmias. Temporary endocardial pacemaker induction of VT, Vf and SVT's is frequent, especially in the presence of an AMI. A temporary lead may penetrate the myocardium in up to 30% of patients, leading to ventricular arrhythmias (with the same morphology as the paced complexes (206,211).

53. **Atrial noninvasive EP Studies with CWS,** via an implanted pacemaker resulted in an unusual form of Single-Chamber PMT, a Far-Field R wave sensing PMT with a triggered atrial response (209).

54. **Transcutaneous Pacing** - (external) has produced Vf and ventricular irritability (214).

55. **Percussion Pacing,** has produced VT and Vf (206).

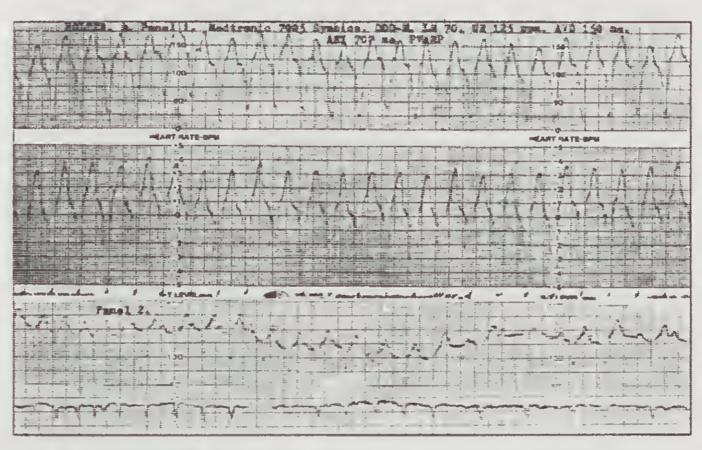


Fig. 4. Congenital AV block. Occasional failure of atrial sensing. Atrial synchronous pacing. Panel 1 - A regular, ventricular-paced, broad QRS rhythm/tachycardia at rate of 150 ppm, without Wenckebach response. Panel 2 - same, except the QRS complexes are not broad and the V spike rate reaches 300 ppm without Wenckebach behavior. Holter artifact; battery failure/exhaustion.

56. Pseudo-PMT's
   a. Malfunctions/defects in Holter equipment and recorders; alterations in tape or paper speeds, due to battery depletion, creating artefactual increases in pacing rates; these changes are not physiologic; there are comcomitant abbreviations in the AV, QRS and QT intervals.
   b. Pseudo-Runaway - Vario function of certain pacers; META VVIR and DDDR systems.
   c. AV sequential pacing at a rate faster than the pLR: DDIR, DVIR, DDDR.
   d. Eccentricities of normal pacemaker function.
   e. Magnifications of the newer digital systems. (7,16,25,117,206). Figures 3 and 4.

Resumen: **Este trabajo discute y repasa los muchos tipos de tachycardias asociadas a marcapasos cardíacos a las cuales el médico contemporáneo podría enfrentarse. Debido a que un diagnóstico certero es la llave para un manejo apropiado, énfasis va a ser puesto en el diagnóstico diferencial de estas complejas tachyarrhythmias. Un acercamiento y punto de partida didáctico es asumido en un esfuerzo para organizar y simplificar en la medida posible esta parte del vasto y complejo campo de la medicina.**

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Pacemakers

Biotec - S.P.A. Bologna, Italy.

Cook Pacemaker Corp. Leechburg, PA. USA.

Cordis - Miami, FL. USA.

CPI (Cardiac Pacemakers, Inc.) - Minneapolis, MN. USA.

ELA Medical - Montrouge, France.

Intermedics Inc. - Freeport. TX. USA.

Medtronic Inc. - Minneapolis, MN. USA.

Pacesetter's Systems, Inc. (Siemens-Pacesetters) - Sylmar, CA. USA.

Teletronics (Teletronics-Cordis) - Englewood, CO. USA.

Ventritex, Cadence - Sunnyvale, CA. USA.

Vitatron Medical - Dieren, The Netherlands.

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Cytomegaloviral infection in heart and heart-lung transplant patients

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Summary: Cytomegalovirus infection is a frecuent complicatíon of heart and heart-lung transplantation. Disease may be asymptomatic, but symptomatic disease may include a mononucleosis-like syndrome, pneumonia, gastrointestinal symptoms, and retinitis. Complications may include bacterial, fungal, and protozoal superinfection, obliterative bronchiolitis, graft rejection, and accelerated graft atherosclerosis. Symptomatic disease is not associated to increase mortality unless CMV pneumonia supervenes. Risk factors for the development of symptomatic disease include the presence of primary disease, a seronegative recipient with a seropositive donor, acquisition of disease from the transplanted organ, age of the patient, and the immunosuppressive regime used. Diagnostic methods include viral cultures from the buffy coat, the use of monoclonal antibodies to detect antigenemia, the detection of viremia using immunofluorescence or immunoperoxidase techniques, and the detection of CMV DNAemia by using PCR. CMV pneumonia is diagnosed by TBB or BAL. Gastrointesltinal CMV is diagnosed endoscopically. Treatment of choice is ganciclovir. Symptomatic disease is best prevented by close monitoring of high risk patients and early detection and treatment of infection. Prophylaxis with a combination of ganciclovir and anti-CMV immune globulin may be used.

Introduction

Infection is the most frequent complication suffered by organ allograft recipients. It is also the most important cause of mortality in these patients. The commonest infections are viral in origin and cytomegalovirus is the most frequent etiologic agent.[1]

It is the purpose of this paper to discuss the clinical manifestations of CMV disease in heart and heart-lung transplant recipients, to discuss the risk factors that may lead to the development symptomatic CMV disease among this patients, and to discuss methods of early detection, treatment, and prevention.

Clinical Manifestations

Most cytomegaloviral infections in heart and heart-lung transplant patients are asymptomatic. In one series it was shown that of 49 patients who had positive serology for CMV, 65% showed no symptoms of disease.[2] 35% of symptomatic patients showed a mononucleosis-like syndrome which consisted of fever, atypical lymphocytes in the peripheral smear, leukopenia, and thrombocytopenia. 16% of patients developed CMV pneumonia while 3.5% patients developed CMV hepatitis. Gastrointestinal CMV infection was also shown to occur among these patients. Manifestations of gastrointestinal CMV disease included gastritis, gastric ulcers, duodenitis, esophagitis, pyloric perforation, and colonic hemorrhage.[3] CMV retinitis was also reported.[1]

Clinical Consequences of CMV Infection

Cytomegalovirus infection will predispose heart and heart-lung transplant patients to a number of complications. Cardiac transplant patients who demonstrate cytomegalovirus seroconversion have an increased incidence of bacterial pneumonia and abscesses during the first 90 days after transplantation as compared to those who remain seronegative.[4] There is an increased risk of fungal infections in heart transplant patients with CMV infection.[5]

An increased incidence of pulmonary aspergillosis and Pneumocystis carinii pneumonia was demonstrated.[6] Cytomegalovirus is thought to contribute to the development of obliterative bronchiolitis in heart-lung transplant patients.[7] It also contributes to the development of acute vascular rejection of the coronary arteries in cardiac allograft recipients.[8] It is associated to the development of accelerated graft atherosclerosis in transplanted hearts.[9] Several mechanisms have been proposed to explain this phenomenon including the existence of a viral mediator of endothelial cell hyperplasia, direct endothelial damage by the virus, and the attachment of virus particles to endothelial cells which would

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then function as haptens that would activate the immune system and would eventually damage neighboring vascular structures.[5]

Mortality

Despite the complications associated to CMV disease, there does not appear to be a significant difference in mortality between patients with symptomatic CMV infection and patients with asymptomatic disease.[10] One series, however, showed a mortality of 47% for patients with CMV syndrome versus 19% for patients for patients without the CMV syndrome.[2] It was explained, however, that this difference was not statistically significant and that the difference was most probably attributable to the death of patients with CMV pneumonia. It was concluded that symptomatic CMV infection by itself does not produce additional mortality unless it is supervened by CMV pneumonia.

Clinical Severity

Several factors will determine the severity of CMV disease in heart and heart- lung transplant recipients. Primary CMV infection after transplantation is highly associated with the development of symptomatic CMV disease. In one study, patients with primary CMV infection were found to be 4 times as likely to develop symptoms when compared to patients who had already been infected prior to transplantation.[2] The serologic status of the donor is also important, but only if the recipient is CMV seronegative.[11] In one series, 64% of seronegative recipients who received an organ from a seropositive donor developed CMV pneumonia. Of those who received an organ from a seronegative donor, only 4.5% developed pneumonia. No significant difference was found in the incidence of CMV pneumonia in patients who were seropositive before surgery, regardless of the donor status. An association between positive pre-transplantation CMV serological status of the recipient and asymptomatic CMV infection was reported.[10] Thesepatients were found to be more susceptible to developing CMV infection after hear transplantation. However, this infections were more likely to be subclinical in nature. The route of infection is also a critical factor in the development of symptomatic infection. The most severe form of CMV disease occurs when the disease is acquired from the donated organ. One study reported that 87% of CMV antibody negative recipients who received a heart or a heart and lungs from a CMV antibody positive donor experienced symptomatic primary infection as compared to 27% of those who received an organ from a CMV antibody negative donor.[12] It is presumed that patients in this last group acquired their infection via blood or blood product transfusions. Morbidity is also organ related. A higher incidence of CMV pneumonia was been demonstrated in patients receiving heart-lung transplants than in patients receiving heart transplants alone.[2] It is thought that this is due to the fact that heart-lung transplant patients are exposed to a larger load of the virus because of the larger size of the organs being transplanted. Heart an heart-lung recipients receive similar immunosuppressive regimes, therefore this is not considered to be a contributing factor in this phenomenon. An increased morbidity was shown for heart and heart-lung transplant recipients who were being treated with cyclosporine than for kidney transplant patient receiving a similar treatment.[2] Age also appears to be a determinant factor in the development of disease. A lower mean age for patients who were symptomatic (34.9) versus patients who were asymptomatic (44.0) was reported.[2] Patients with primary disease tended to be younger than those with disease reactivation. This was most likely a reflection of the fact that older patients had had a greater chance of exposure to CMV throughout their lifetimes than younger patients. An extremely important risk factor for morbidity from CMV is the immunosuppressive regime used after surgery. There appears to be a similar morbidity due to CMV in heart and heart-lung transplant patients treated with cyclosporine as in patients treated with a more traditional azathioprine regime.[2] No significant difference in morbidity was noted between patients who experienced reinfection or reactivation of their disease rather than primary infection.[2] No significant difference in morbidity was found between patients who received treatment with rabbit antithymocyte globulin for acute episodes of rejection as compared to those patients who did not receive treatment.[2] Similar results were reported when using intravenous methylprednisolone for the treatment of rejection episodes.[11] However, this association was noted only after the first 90 days affer transplantation.

Diagnosis

Early diagnosis is essential for the effective treatment of CMV infection in heart and heart-lung recipients. A strong association between symptomatic CMV infection and viremia was found.[2] It was also demonstrated that cultures from the buffy coat of symptomatic patients are more likely to be positive than cultures from other sites.[2] It is postulated that direct detection of CMV from buffy coat samples is an effective method of detecting high risk patients and of following antiviral therapy. Combined detection of CMV IgM and viremia was found to be highly sensitivity.[13] The combined use of both methods is indicated in the screening of patients who are known to be at risk for CMV infection. The use of monoclonal antibodies as a way to detect early CMV antigenemia has been proposed.[14] The group that did this work was able to detect antigenemia 6 days before

seroconversion. Diagnosis was confirmed by viral culture 4 to 6 weeks later. They concluded that direct antigen detection by using monoclonal antibodies is an effective method of early diagnosis of CMV infection. Other methods that have proven to be effective in the early diagnosis of CMV infection have been the detection of CMV in the nuclei of infected polymorphonuclear leukocytes by the immunoperoxidase and immunofluorescence techniques[15] and the detection of DNAemia by the polymerase chain reaction.[16] The diagnosis of CMV infection by the detection of CMV DNAemia using the polymerase chain reaction has been found to be of little clinical importance because the very low levels of virus required for a positive result will frequently not cause symptomatic disease[17]. PCR results are not quantitative and will therefore not provide a clear indication for initiation of antiviral therapy. Virologic monitoring based on the quantification of viremia and antigenemia is more useful in the diagnosis of clinically significant disease. PCR positive blood samples, however, may persist after treatment with ganciclovir. A patient may be clinically stable and no viremia or antigenemia may be detected. In other words, a positive PCR may be the only indication of persistent CMV infection after treatment has been completed. The persistence of CMV DNA may be indicative of a continuous risk for the recurrence of symptomatic disease.

Monitoring antigenemia and viremia in patients who are clinically stable but wh still have a positive PCR may be an effective way of diagnosing in an early fashion recurrence of symptomatic CMV disease. The diagnosis of CMV pneumonia requires the demonstration of lung inflammation by performing tracheobronchial biopsy, according to one group of investigators.[11] In their series, patients who had evidence of CMV infection confirmed by TBB or BAL but who had no evidence of inflammation were not treated. No fatalities were reported among this group. Endoscopic evaluation is indicated in heart and heart-lung transplant patients with gastrointestinal symptoms in order to rule out the possibility of CMV disease.[3] The most common endoscopic findings are gastric erythema with erosions, gastric ulcerations, nodules, polyps, and esophageal erythema. Definite diagnosis of CMV disease is made by demonstrating inclusion bodies in mucosal tissue obtained from a biopsy.

Treatment

Several treatment regimes have been used for cytomegaloviral infection in heart and heart-lung transplant recipients. Clinical trials with vidarabi monohydrate, acyclovir sodium, interferon, or combinations of these have not yielded positive results. Clinical trials with ganciclovir have demonstrated good invitro antiviral activity in patients with CMV infections.[18] Ganciclovir is an acycli guanine analogue and is structurally similar to acyclovir. Its intracellular triphosphate metabolite is an inhibitor of viral DNA polymerase. It inhibits viral replication without eliminating the virus from the host cell. Therefore recurrence of the infection after therapy has been completed is a distinct possibility. In one series, ganciclovir was found to eliminate viremia in 93% of patients in a mean of 4.7 days.[19] It was associated to clinical improvement in 58% of patients. It was effective in the treatment of 45% of patients with CMV pneumonia, as evidenced by an improved clinical picture and by negative cytology obtained from BAL. The major adverse effect observed was neutropenia, which occurred in 35% of patients. One group of investigators reported resolution of histologic changes, as demonstrated by TBB of BAL, in 80% of its patients.[11] Another group treated its patients with ganciclovir sodium IV 5mg/kg BID for two to eight weeks.[3] Therapy was associated with resolution of gastrointestinal symptoms in all patients during the first week. Follow up endoscopy revealed improvement in gastritis within two weeks and healing of gastric ulcers in all cases between four and twelve weeks after initiation of therapy. Nodules and gastric polyps did not fully resolve in all patients. Mucosal cultures were negative between two to six weeks after initiation of therapy. No adverse reactions to ganciclovir were reported in this series.

Prevention

As with any other disease, prevention is considered to be the most efficacious way of controlling post-transplantation CMV infection. One group of investigators proposed that CMV antibody negative transplant recipients only receive organs from CMV antibody negative transplant donors.[20] They reported no deaths from organ transmitted disease since they adopted this policy. Another group, however, claimed that the matching policy, although desirable, is not essential.[21] They demonstrated that high-dose CMV immune globulin given prophylactically to CMV mismatched graft recipients may be effective in preventing clinical CMV disease. One group concluded that, although matching reduces the incidence of CMV pneumonia, it will also diminish the already reduced number of grafts available for transplantation to seronegative patients.[11] According to them, monitoring of all patients at risk during the first 3-4 months after surgery together with early diagnosis and treatment is the most effective way of reducing morbidity and mortality associated to CMV infection. It has been shown that passive immunization with anti CMV immunoglobulin may help prevent symptomatic CMV disease but it will not prevent infection.[22] 77 heart transplant patients, regardless of their serologic status, were treated with the anti CMV immunoglobulin during the first three

post operative months. 13% developed CMV disease, a significantly lower number than that obtained in the literature (84%). However, 50% of the patients excreted CMV. The protection received is similar to the one obtained by naturally acquired anti-CMV resistance. Prophylactic administration of ganciclovir has been shown to reduce the incidence of CMV induced illness.[23] However, it provides protection only to CMV seropositive patients. Incidence of CMV illness was 2.5 times greater in the placebo group. The incidence of CMV disease was related to patients previous serologic status. The authors proposed that a combination of ganciclovir and anti-CMV immune globulin may be effective in prophylaxis against CMV in heart transplant patients.

Conclusion

Cytomegalovirus infection in heart and heart-lung transplant patient carries with it considerable morbidity and mortality. Although effective, treatment with ganciclovir does not guarantee that symptomatic disease will not recur. Close monitoring of this patients is, therefore, mandatory in order to detect promptly any infection and treat it appropriately.

Resumen: Una de las complicaciones que más frecuentemente ocurre luego de un transplante de corazón o de un transplante de corazón y pulmón es la infección por citomegalovirus. Esta infección es usualmente asintomática, pero pued manifestarse como un síndrome parecido a la mononucleosis, como un síndrome gastrointestinal, como una pulmonía, o como una retinitis. Complicaciones de la infección pueden incluir rechazo del injerto, aterosclerosis del injerto, bronquiolitis obliterativa y sobreinfección bacteriana, protozoaria, o por hongo. Infección sintomática no está asociada a un aumento en mortalidad a menos que ocurra una pulmonía por citomegalovirus. Factores de riesgo para el desarrollo de enfermedad sintomática incluyen infección primaria por citomegalovirus luego del transplante, un recipiente seronegativo con un donante seropositivo, la adquisición de la enfermeded mediante el órgano transplantado, el uso de ciclosporina como agente inmunosupresor, y la edad del paciente. Métodos diagnósticos incluyen cultivos virales del "buffy coat", el uso de anticuerpos monoclonales para detectar antigenemia, detección de viremia usando técnicas de inmunofluorescencia o de inmunoperoxidasa y la detección de DNAemia usando el "Polymerase Chain Reaction". La pulmonía por citomegalovirus puede ser diagnosticada por biopsia traqueobronquial o por lavado bronquioalveolar. Infecciones gastrointestinales por citomegalovirus pueden ser diagnosticadas por endoscopía. El tratamiento de elección es ganciclovir. El desarrollo de enfermedad sintomática puede prevenirse mediante la detección temprana y el tratamiento de la infección. Una combinación de ganciclovir con immunoglobina anti-CMV puede ser utilizada profilácticamente.

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Artículos Originales:

Algunas Consideraciones Clínicas Sobre el Manejo Hospitalario de Pacientes con el Trastorno de Personalidad Múltiple

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Resumen: En este artículo se presenta una breve revisión del trastorno de personalidad múltiple (TPM), el cual es considerado actualmente como una defensa disociativa en respuesta al trauma masivo en la niñez y adolescencia. Ambos autores aunamos nuestra experiencia clínica con este tipo de paciente en el ámbito hospitalario. El paciente típico con TPM es uno muy retante en este tipo de ambiente debido a las frecuentes crisis disociativas, a actos de furia y mutilación y al coraje o miedo que engendra la hospitalización en las personalidades alternas. Añádase a todo esto el hecho de que un porciento mayoritario del equipo de tratamiento suele desconocer la complejidad fenomenológica de un TPM, lo que a veces provoca divisiones y crisis entre los mismos profesionales. En este trabajo no sólo describimos esta situación sino que ofrecemos unas guías preliminares que van dirigidas al personal hospitalario para que se logre un mejor entendimiento y manejo del TPM.

El desorden de personalidad múltiple (DPM) es uno de los síndromes psiquiátricos más retantes que un profesional de salud mental pueda toparse en su carrera profesional. Aunque casos de DPM han sido identificados desde hace más de dos siglos [1,2], no es sino posterior al 1970 que el entendimiento etiológico y terapéutico ha venido a ocupar un lugar prominente dentro de la literatura psiquiátrica. Como meros ejemplos de ello, tenemos que: a) actualmente se han publicado más de 700 artículos en revistas profesionales sobre la temática; b) se han identificado más de 5,000 casos en Estados Unidos, Canada y Europa; c) desde el 1988 se viene publicando una revista especializada en la temática (Dissociation); d) la American Psychiatric Association ha coordinado varios talleres de capacitación sobre su detección y manejo; e) para comienzos de la década de los 80's se constituye la Sociedad Internacional para el Estudio de la Personalidad Múltiple y la Disociación.

Todo este creciente interés ha repercutido en un conocimiento clínico teórico mucho más sofisticado y amplio que el que teníamos hace apenas dos décadas atrás. Hoy día, por ejemplo, podemos indicar que el DPM es un trastorno disociativo en donde la **identidad, memoria y consciencia** se alteran de manera marcada. Estas alteraciones son producto de estructuras mentales paralelas, pero independientes del yo-ejecutivo[3], las cuales se han disociado de la consciencia de la persona. Estas estructuras paralelas pasan entonces a ser las recipientes de afectos, memorias y emociones, los cuales el paciente nunca llegó a procesar de una manera adecuada. Aparentemente, este proceso comienza a germinarse temprano en la niñez, propiciado por un ambiente extremadamente estresante, en donde resaltan el abuso sexual, físico y emocional en más del 85% de los casos[5]. De hecho, y como bien lo elaboran Spiegel y Cardeña[6], el DPM básicamente es una defensa disociativa masiva la cual le permite a la persona sobrevivir un ambiente traumático. El mecanismo defensivo disociativo produce una "barrera de amnesia" que puede resultar en trastornos disociativos, siendo la amnesia y la fuga psicógena los menos complejos, hasta llegar a la complejidad extrema de un DPM, en el cual se ramifican y se subdividen los componentes disociados[7].

Actualmente, el DSM-III-R[8] dispone que para diagnosticarse un DPM el paciente tiene que presentar los siguientes criterios:

A: La existencia dentro del individuo de dos o más personalidades distintas o estados de personalidad (cada una con un patrón relativamente idiosincráticode percibir, relacionarse y pensar sobre el medio ambiente y sobre su propio yo).

B: En algún momento y recurrentemente cada uno de estos estados de personalidad toma control total de la conducta del individuo.

El DSM-IV, el cual se publicará para el 1994 incluirá un criterio adicional:

C: La persona no logra recordar información personal importante la cual es muy extensa para poder ser explicada por olvidos rutinarios o por un desorden mental orgánico.

El paciente típico con DPM es una mujer relativamente joven, con un historial de abuso severo y con

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polisintomatología somática y psiquiátrica. Esta polisintomatología muchas veces propicia diagnósticos equívocos y espurios, tales como esquizofrenia, depresión mayor, trastorno de pánico y epilepsia. Entre los síntomas más notables podemos mencionar dolores de cabeza recurrentes e intensos; labilidad anímica y conductual; intentos mutilatorios y suicidas; escuchar voces dentro de la cabeza; ataques y desmayos; y, principalmente, quejas de pérdida de memoria. Es, precisamente, durante estas lagunas mentales que las diversas personalidades actuan en el medio ambiente, muchas veces manifestando sus propias preferencias y gustos, los cuales suelen ser marcadamente diferentes a los de la paciente.

En Estados Unidos y Canada el promedio de personalidades alternas por pacientes es de 13[9]. Nuestro análisis de 15 casos de DPM en Puerto Rico indica que la media es de 4[10]. Al manifestarse, dichas personalidades suelen expresar intereses, valores, conductas y emociones idiosincráticos a su auto-imagen. Por ejemplo, es común que mientras la paciente se caracterice por ser una mujer ansiosa, poco afirmativa y tímida, algunas de sus personalidades sean su opuesto. Esto es, asertivas, liberales, arriesgadas, promiscuas y extrovertidas. En varios casos que hemos estudiado, algunas personalidades alternas han llegado a tener su propio guardarropas y pertenencias. Asimismo, en un 80% de los casos casi invariablemente se manifiestan personalidades de niñas pequeñas, las cuales se quejan a lágrima viva del abuso sexual incestuoso que le propinan. Las personalidades de niñas usualmente están congeladas en tiempo y no reconocen que el abuso ya acabó[11].

Estudios psicofisiológicos han documentado, de manera consistente, que las personalidades muestran reacciones psicofisiológicas disímiles unas de otras y que estos hallazgos no pueden ser explicados por grupos controles de simuladores. Entre las diferencias documentadas se encuentran cambios en lateralidad, en los reflejos, sensibilidad al dolor, EEG, respuestas en los Potenciales Evocados, en la respuesta galvánica de la piel, en agudeza visual y otras variables relacionadas con el sistema autonómico. En los cambio bioquímicos es importante mencionar diferentes respuestas a un mismo medicamento (reacciones primarias y adversas) y diferentes reacciones alérgicas [12, 13, 14, 15, 16, 17].

En Puerto Rico, los autores y otros colegas han logrado detectar y tratar 19 casos de DPM en los últimos 4 años. Los resultados de los análisis clínicos de dichos casos han sido expuestos en otras publicaciones profesionales. De los mismos se desprende que la configuración clínica del paciente puertorriqueño es similar y paralela a la de los pacientes en Europa, Canada y EE UU .

Nuestro propósito básico en este trabajo es ofrecer algunas sugerencias sobre el manejo del paciente con DPM en el ambiente psiquiátrico hospitalario. Esta labor resulta de gran relevancia ya que estudios recientes indican que una minoría significativa de pacientes hospitalizados poseen trastornos disociativos, en donde incluimos fugas, amnesias psicógenas y DPM.

Orientación Sobre el Manejo de un DPM en el Hospital Psiquiátrico

De la literatura especializada sobre el tratamiento hospitalario del DPM y basándonos en nuestra experiencia clínica con este tipo de población, resulta evidente que todo profesional que labore en hospitales psiquiátricos debe de tener al menos unas nociones básicas sobre las dificultades inherentes que presenta este tipo de paciente. Este punto se dramatiza cuando tomamos en cuenta que en EE UU y Canada del 60 al 80% de los pacientes con DPM en algún momento han sido hospitalizados–en muchas ocasiones repetidas veces[18]. En Puerto Rico, basándonos en 15 casos detectados por los autores y por otros clínicos, este porcentaje alcanza el 60% [10]. Como podemos notar, pues, el paciente con DPM es uno vulnerable a entrar en crisis agudas que ameritan una hospitalización psiquiátrica.

Estas crisis usualmente se relacionan a impulsos e intentos suicidas, mutilación corporal, amenazas de violencia interpersonal, estados de fuga y amnesia muy recurrentes e intercambios descontrolados y rápidos entre las diversas personalidades. En la Tabla I podemos apreciar los motivos de hospitalización en 4 pacientes con DPM que ameritaron una hospitalización psiquiátrica durante el 1990. Dichas crisis casi invariablemente son provocadas y propiciadas por algunas de las personalidades alternas las cuales al introyectar la figura del agresor continúan infligiendo maltrato físico/emocional de una manera irracional y virulenta.

Tabla I.
Motivos de Hospitalización en 4 Pacientes con DPM

Paciente	Número de Personalidades	Crisis Precipitadora
María	3	Descontrol en el surgimiento de las personalidades y episodio psicótico.
Teresa	9	Intento suicida y fugas psicógenas.
Esperanza	4	Conducta auto-destructiva.
Melba	4	Fugas psicógenas excesivas y amenaza interpersonal.

El Proceso de Hospitalización

Una vez la paciente pasa por el proceso de admisión, el médico de guardia confundido ante la sintomatología presentada—suele diagnosticar una "depresión mayor con rasgos psicóticos" o "esquizofrenia". Al llegar a la sala, y si su psicoterapeuta primario conoce del DPM de ésta, se recomienda el siguiente proceso de intervención:

(1) **Reunir y orientar lo más pronto posible a todo empleado que de una manera directa o indirecta ofrezca algún tipo de intervención a la paciente. Aquí incluimos a psiquiatras, psicólogos, trabajador social, terapeutas ocupacionales y enfermería.**

El propósito medular de esta reunión es orientar al personal sobre el diagnóstico de DPM y lo que este implica. En el caso nuestro, uno de nosotros (AMT) realizó esta labor ofreciendo charlas educativas por especialidad. Al respecto se utilizaron fotocopias de artículos y evidencia fílmica de varios casos. Durante dichas charlas, se clarificaba que era un DPM, sus comunalidades y diferencias con una psicosis, cómo manejar diversas crisis, qué hacer cuando las personalidades alternas intervienen para sabotear el tratamiento, el número de personalidades alternas de la paciente y algunas de sus características, y cómo crear un ambiente terapéutico dentro de esta situación. Dichas reuniones suelen ser beneficiosas tanto para los profesionales como para la paciente. Para los primeros porque éstos pasan por la experiencia de desmitificar y entender clínicamente lo que es un DPM. Para la segunda, porque mientras más conocimientos tengan sus terapeutas, más aceptada y segura ésta se sentirá en el ambiente hospitalario.

(2) **Coordinar las intervenciones terapéuticas de acuerdo a lo que implica un DPM y proveer un plan de acción individualizado.**

Es usual que al ingresar un paciente con DPM, muchos profesionales se pregunten: ¿cómo intervengo en esta situación? Además de la orientación que ya describíamos, es importante que el caso se discuta a nivel interdisciplinario y que se diluciden unos acuerdos básicos de intervención. Si este esfuerzo no se realiza, su estadía en el hospital puede ser contraproductiva. Veamos algunos ejemplos: Teresa acostumbraba oír, casi a diario, las voces de sus personalidades alternas. Este síntoma es uno de los más comunes en un paciente con DPM[19]. Cuando la paciente se quejaba de ellas, las enfermeras de turno le decían: "No le hagas caso; las voces no son reales". Esta intervención, la cual podría ser apropiada para un paciente psicótico, es inadecuada en un paciente DPM. En el caso de Teresa, cuando las personalidades alternas oían a las enfermeras decir que ellas "no son reales", entendían esto como un rechazo a su autonomía y solían ponerse molestas; reacción que repercutía adversamente en la paciente. En otro caso, un psiquiatra, pensando que las voces eran sintomáticas de un proceso psicótico, comenzó a utilizar dosis altas de anti-psicóticos, lo que le provocaba a la paciente gran malestar por las reacciones extrapiramidales. Esta situación es preciso traerla a colación porque hoy sabemos que los anti-psicótico ejercen poca o ninguna efectividad en los trastornos disociativos[20]. En pacientes con DPM es mucho más difícil predecir los efectos primarios y secundarios de los psicofármacos. Diferentes personalidades en un mismo paciente pueden responder diferente a un mismo medicamento y dosis. En ocasiones las reacciones pueden ser paradójicas (por ejemplo, el ansiolítico induce ansiedad o hasta una psicosis). Asimismo, el paciente con DPM tiene más riesgo de sobredosis, intentos suicidas o mal uso accidental de medicamentos. En general sólo se favorece el uso de éstos con una supervisión cercana, en una forma descontinuada, cuando son absolutamente necesarios y por el tiempo y dosis menor posibles. El litio puede ser favorable en pacientes con DPM y un trastorno bipolar coexistente [20].

A nivel general, se recomienda que se trate a cada personalidad como a un individuo realmente diferente de acuerdo a su patrón conductual y a su auto-percepción. Por ejemplo: no debemos permitir que asista una personalidad infantil a una terapia de grupo de adultos y debemos presentar y mostrar las reglas de la sala a cada personalidad del paciente. Lo ideal es que al momento de tomar decisiones se consulte a cada una de las personalidades y que en el proceso vayan firmando los acuerdos y consentimientos logrados. De no hacerse así algunas personalidades pueden encolerizarse con otras por no ser tomadas en cuenta. Esto puede repercutir en estados de auto-agresión y sabotaje de otras medidas terapéuticas. También se debe favorecer que todas se conozcan entre sí y que empaticen y se identifiquen con la personalidad principal de la cual se fragmentaron. Este proceso es esencial para la eventual fusión de estas. En el proceso de crisis en la sala, la hipnosis o incluso la restricción por amarras han resultado de ayuda inmediata[21,22]. En la hospitalización las metas deben ser claras y limitadas. Por ejemplo: reducir al mínimo estados de agresividad y violencia; lograr imponer controles en aquellas personalidades que desean sabotear el proceso de terapia ambulatoria; aumentar la autosuficiencia ante la presencia de estresores cotidianos, etc. Sabemos que la eventual integración y fusión tomará meses o años de esfuerzos terapéuticos, pero los mismos son exitosos en un 25-50% de los casos. El extender una hospitalización de una manera desmedida, una vez se logren las metas indicadas, puede provocar recaídas en patrones de conductas agresivas.

Situaciones como éstas ejemplifican la importancia de coordinar las intervenciones terapéuticas y proveer un plan de acción individualizado, el cual usualmente es diferente al del paciente típico con psicosis o con depresión mayor.

¿Cómo lidiar con el escepticismo de algunos profesionales?

Una vez admitido el paciente a la sala, casi de inmediato suele correrse la voz por todo el hospital de que ingresó un individuo con DPM. Algunas reacciones que repetidas veces hemos escuchado son de temor e incertidumbre. Para unos pocos el diagnóstico es sinónimo de estados de posesión y demonomanía. Para otros pocos, el DPM es sinónimo de una persona psicopática o histriónica en búsqueda de satisfacer deseos patológicos de atención. Sea cual sea la razón, lo cierto es que es usual toparse con empleados que suelen reaccionar de una manera irracional ante un DPM. Como bien dice Kluft[18]:

"El tratamiento de estos individuos es inherentemente difícil y demandante. Los diferentes profesionales usualmente experimentan una tensión y angustia considerable en sus esfuerzos por cuidar de ellos. Empleados con vasta experiencia en el hospital pueden polarizarse sobre como enfocar a los pacientes con DPM y a veces suelen sentirse sin herramientas en sus primeros contactos con estos. Los clínicos veteranos comúnmente se sienten desorientados y perturbados al intentar aplicar su vasta experiencia y conocimientos en el tratamiento de esta población" (p.696).

Esta situación polarizante, la cual los autores hemos podido constatar, cuenta con pocos puntos a su favor. En primer lugar, la paciente suele ser la recipiente de mensajes y comentarios contradictorios los cuales aumentan su sentido de incomprensión y desesperanza. En segundo lugar, algunos empleados, a identificarse demasiado con la paciente o al desligarse excesivamente de ella, crean un ambiente de crítica solapada el cual es contraindicado.

Es por ello que previamente insistíamos en la necesidad de que el terapeuta que refiere (o descubre) el caso se reúna con el equipo y oriente al mismo sobre lo que es un DPM y síntomas específicos de la paciente. Nuestra experiencia coincide con la de Steinmeyer y colaboradores [25] quienes han notado que "una revisión de nuestra experiencia en el manejo de pacientes con DPM le hizo abundantemente claro a nuestro equipo de trabajo que para que el tratamiento fuera efectivo se tenían que aclarar diversas situaciones de manera organizada, esto si queríamos una cohesión en el equipo y una unidad en el ambiente terapéutico".

Nuestra experiencia con pacientes DPM hospitalizados en Puerto Rico apoya las impresiones de Steinmeyer. Nuestro afán de que estas pacientes fueran comprendidas y que no siguieran siendo estigmatizadas o mal diagnosticadas fue relativamente exitoso. Esto lo constatamos a través de comentarios, actitudes y conductas, las cuales se tradujeron en un mejor conocimiento de las dinámicas internas de la paciente y un mejor control en el momento de realizar una intervención en crisis.

Conclusión

Estudios en EE UU, Canada y Holanda indican que la hospitalización psiquiátrica de un paciente con DPM no es un asunto raro[18,26]. De hecho, en dichos países ya existen clínicas o pabellones que se especializan en el tratamiento de desórdenes disociativos y de personalidad múltiple[18]. En Puerto Rico, en un año los autores identificaron y trataron a 4 pacientes con DPM en un hospital psiquiátrico. Ahora que sabemos que el DPM no es tan "raro" como se suponía hace dos décadas atrás, y que la gran mayoría de estos pacientes son mal diagnosticados, nos toca a los psiquiatras, médicos y psicólogos la responsabilidad de enterarnos sobre los procedimientos clínicos que llevan a un diagnóstico diferencial riguroso[27]. Un DPM rara vez se puede detectar con una evaluación rutinaria de estado mental y menos aún con alguna prueba tradicional de lápiz y papel. El DPM, por definición, es un trastorno **encubierto** el cual el propio paciente suele desconocer.

Debido a las frecuentes crisis disociativas, un porciento considerable de estos pacientes en un momento determinado tendrán que ser hospitalizados. Si los profesionales a cargo de realizar un diagnóstico diferencial no auscultan clínicamente la presencia de síntomas disociativos, difícilmente el DPM será detectado. La consecuencia será que se le ofrecerá al paciente un servicio paliativo, que en nada o poco alterará su psicopatología, llevándolo a hospitalizaciones prolongadas y repetitivas. Precisamente, dos de los casos que identificamos eran mujeres jóvenes que habían sido diagnosticadas como "esquizofrénicas" desde hacía más de 15 años y quienes habían recibido en sus terapias ambulatorias una variedad increíble de psicofármacos. Una vez detectado su DPM, con el debido tratamiento hoy día éstas manejan su vida a un nivel satisfactorio, sin psicofármacos y sin el estigma de la esquizofrenia. Curiosamente, Steinberg [28] recientemente informó un caso de una mujer puertorriqueña quien por más de una década había sido hospitalizada en diversos hospitales psiquiátricos en Puerto Rico con un diagnóstico de "esquizofrenia". Su DPM fue diagnosticado y detectado en Connecticut, lo que alteró todo el sistema de tratamientos que esta había estado recibiendo por años.

Por último, secundamos la sugerencia de Ross[7] en el sentido de que los administradores y los responsables del adiestramiento de educación continua de los hospitales psiquiátricos, faciliten la realización de talleres sobre la temática del DPM. Asimismo, recomendamos que si un profesional sospecha la presencia de un DPM en un/una paciente (mujer joven; historial de abuso sexual en la niñez; oír voces; amnesias frecuentes; dolores intensos de cabeza; inestabilidad anímica) se le administre una entrevista estructurada específica para auscultar un DPM o, al menos,

la Escala de Experiencias Disociativas la cual estamos utilizando en nuestra práctica privada [29, 30, 31, 32].

Nuestra experiencia nos indica que con un buen diagnóstico diferencial, con un equipo interdisciplinario informado y con un ambiente terapéutico libre de confusiones innecesarias, el paciente con DPM puede beneficiarse de manera considerable y perdurable de su estadía hospitalaria.

Summary: **In this article we present a brief review of multiple personality disorder (MPD) which today is conceptualized as a dissociative defense in response to child abusive experiences. In this paper we highlight our clinical experience with the clinical management of MPD in the hospital setting. While hospitalized the typical MPD patient usually presents multiple dissociative crises, bodily mutilation and other serious difficulties. Unfortunately, many members of the hospital staff don't had much clinical experience with MPD patients, a fact that partly explains the usual disparate and irreconcilable ways in which those patients are treated. In this paper we not only describe this state of affairs but also present some specific clinical guidelines directed toward the professional hospital staff, with the intention to offer an efficient and efficacious management to patients with MPD.**

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